The RCEME QUARTERLY

Volume 3 JANUARY, 1951 Number 1

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No 1

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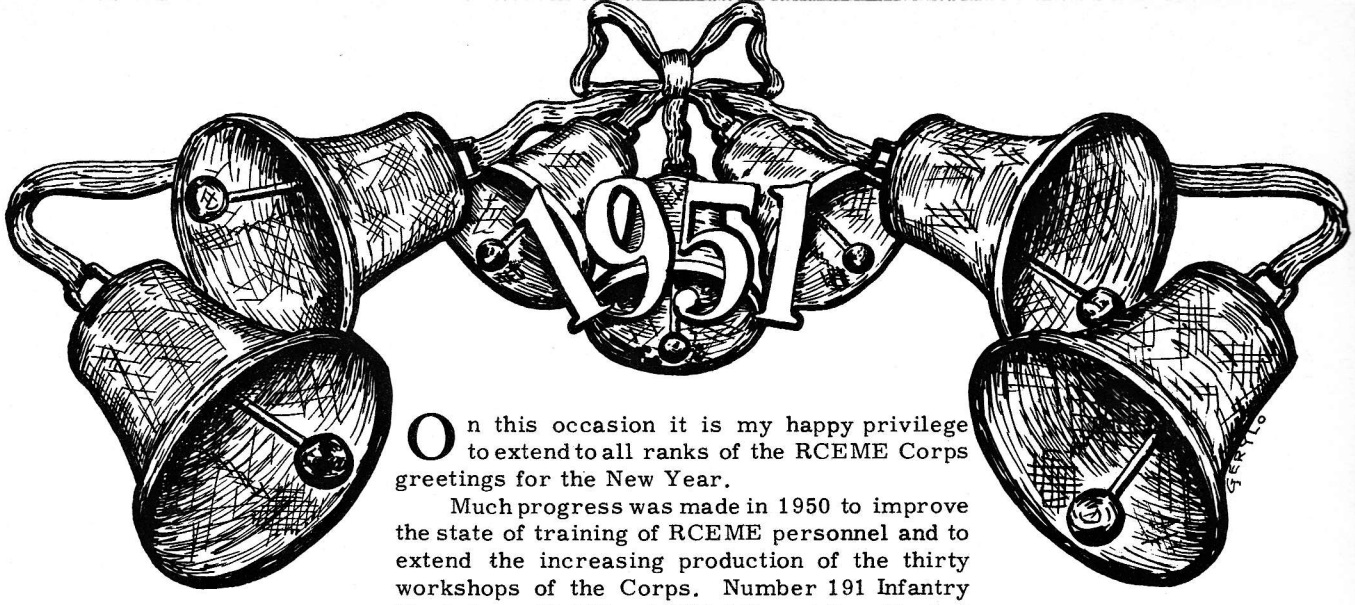
A.H.Q. OTTAWA

OTTAWA
EDMOND CLOUTIER, C.M.G.; B.A., L.PH.,
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
CONTROLLER OF STATIONERY

Jan
1951



On this occasion it is my happy privilege to extend to all ranks of the RCEME Corps greetings for the New Year.

Much progress was made in 1950 to improve the state of training of RCEME personnel and to extend the increasing production of the thirty workshops of the Corps. Number 191 Infantry Workshop with 192 and 193 LADs and the attached RCEME personnel have opened up for business to service the units of the CASF at Fort Lewis. Number 25 Canadian Support Workshop was mobilized and is completing its basic training at Barriefield. Tradesmen of the Corps are serving in Korea with the 2nd Battalion PPCLI.

The Reserve Force is building up on the solid foundation of its new organization and the consequent support from industry and valuable assistance from the RCEME Corps Association.

In 1951 the tremendous increase in military activity will require an expansion in the RCEME services that will necessitate the most effective use of all our resources. Officers will need to follow the principles of sound engineering management by planning their production for the most efficient use of the plant, labour, and material at their disposal. Young officers of the Corps will have to assume greater responsibility without the luxury of more time to overcome their reputed lack of experience. The warrant officers and non-commissioned officers will need to supervise and inspect the work of an increasing number of craftsmen and civilian tradesmen.

Phase II of the Formation of REME has been authorized for the British Army and has been recommended for adoption by the Canadian Army in order to provide a more efficient use of skilled manpower in the electrical and mechanical trades.

With such increased responsibility and full capacity operations, this year should be one of great interest to all ranks of our Corps. May I wish each of you individual success in this New Year with its promise of opportunity and achievement.

C. R. Boehm

(C. R. Boehm) Colonel,
January 1951.

THE RCEME QUARTERLY

The information and statements herein are not to be quoted as authority for action. The Quarterly is published to assist RCEME personnel in keeping abreast of current trends and developments and to circulate interesting news about the corps.

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EDITORIAL

HAPPY NEW YEAR

Having got that off our chest may we, in the time-honoured manner, stop for a moment and take stock of our position as the magazine of the RCEME Corps. Let us look at what we have accomplished in the two years of our life and, at the same time, polish up our crystal ball and see what the future holds.

We've touched only the fringe of subjects suitable and available to us. Subjects that we, as the Corps Quarterly, should in due course cover completely for the interest of our readers. There are dozens of subjects yet that could be written up by members of the Corps willing to give a little of their time.

On the technical side we have had a good article on RADAR by Major H. M. Robinson, now head of the Electronics Coy at the School. Capt Protheroe, of DME, has done a two-part article on the ideal 100-man RCEME Workshop, and Lt Mildon, a lubricant specialist with DVD, has started what we hope will be a series of articles on lubricants and gasoline.

WOI Tatham of 17 Coy, brushed up his memory by much research into war diaries and gave us a very interesting wartime history of 123 LAD, which was attached to the Armoured Personnel Carrier Regiment. We think there are many such Second World War histories that with a little dusting off, would make informative reading and would add to the heritage of our Corps.

The history of flame warfare has been told by Capt Collins, now in DME, and there is more on this subject in this issue.

Two writers have taken the trouble to tell of their travels while on course in the UK. Capt Sergi of the RCEME School staff, while at MC of S, spent part of his time on the continent and made some notes and took some pictures to prove it. On return from his course at Blackdown WOII Wright of DME delighted us with his fine photos and word pictures of England.

We started optimistically in the very first issue to report on Corps units and began with the RCEME School. That effort unfortunately died a premature death. We'll try to revive it and finish the job in 1951. In the planning-for-the-future department we are working on plans to find out what makes other parts of RCEME

(Continued on Page 17)

PEDIGREED LUBRICANTS
The nature of petroleum

by LIEUT W. J. MILDON, RCEME
Directorate of Vehicle Design

People are nosey. They want to know everything about everything. They are introduced to a person and immediately start wondering where he came from, his background, his habits good and bad, his material wealth, his social outlook, what his abilities are, and what he actually does for a living. Junior is said to be mechanically inclined when he starts pulling apart his mechanical toys at an early age. Others say he is just plain ornery and destructive. Actually it is the beginning of a development of an inquisitive nature inherent in people. Civilization would not be where it is today, were it not for this trait in early and modern scientists. (Some will snicker at this point and say it would have been better if they had not been so inquisitive.)

But it is more than just idle curiosity that directs us to investigate the nature of petroleum. We are compelled by necessity to know just how, when, where, why and what is petroleum. Petroleum products are so much a part of our daily life, that everyone should know something about them, particularly how to use them wisely and efficiently. The natural resources of the world are being depleted at an alarming rate, and the improper use of an oil, fuel, grease, etc, means waste of material in the form of bearings, shafts, engines, etc; waste of power through unnecessary friction; and waste of petroleum itself through excessive oil consumption and inefficient refining methods, as well as waste of money and labour. By trying to understand the nature of petroleum, its capabilities and its limitations, we shall be better equipped to make the best use of its products. It is with this end in mind that this article is written.

* * * * * * * * * * * * * * * * *

Over 5000 years ago, the Egyptians used an embalming fluid called bitumen. This was petroleum used in its crude pitchlike state. The Persian word for bitumen was mumiai, and consequently, the preserved corpses of the ancients became known as mummies. This was the modest beginning of the petroleum industry.

About the time that Cleopatra was casting doubts as to which was the weaker sex, oil was being crudely refined by a simple settling process in the region of what is now called Iraq. But it was not until 1788, when the potentialities of petroleum were sufficiently visualized, that the curiosity of a German scientist named Winterl was aroused as to its nature and source. He conducted several experiments, and as a result developed the theory that crude oils were a by-product of combustion. Others later contended that oil came from the decay of vegetable and animal matter. It is this latter view that is at present in vogue.

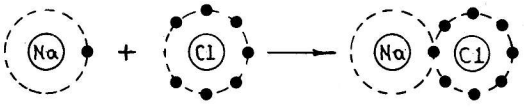
In 1817 a French naturalist, de Sausure, analyzed a low grade of naphtha, and his chemical analysis showed that it contained 86% hydrogen, and 14% carbon. This established a fact still of paramount importance and that is, that in spite of the complexity of crude oil, it consists chiefly of these two elements. However carbon and hydrogen, being quite versatile, combine in many ways to form thousands of different structures called hydrocarbons, many of which are as yet unknown. This ability to group themselves is based upon what is called valence of the elements. Valence may be compared to the human hand. The hand enables a person to grab something and hang on, and if he had six hands he could fasten on to six objects. Similarly, the carbon atom which has four hands, or a valency of four, can attach itself to four other atoms, while hydrogen, having a valency of one, can attach itself only to one.

The valency of elements is based upon their electronic structure. Without going into detail it will suffice to say that a certain number of electrons are required in the outer orbit or shell of an atom for it to have stability and, depending upon whether it has a deficiency or surplus of electrons, it will give up or take on electrons from another atom to form a stable compound; or else two atoms with deficiencies will share electrons to form a stable substance. For example:

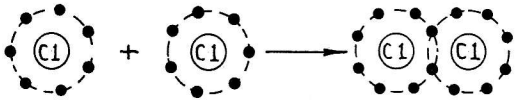
Chlorine (Cl) has 7 electrons in the outer orbit, but requires 8 electrons for stability, giving it a deficiency of 1 electron (or a surplus of 7).

Sodium (Na) has 1 electron in the outer orbit.

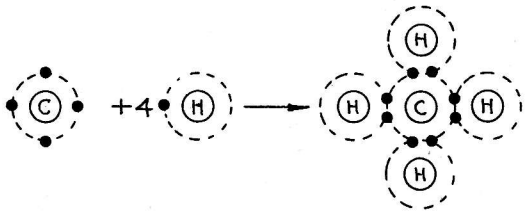
The inner orbit is complete. Therefore sodium has a surplus of one electron (or a deficiency of 7).
The mechanism of the reaction between sodium and chlorine to form common salt can therefore be shown as:



This is a typical illustration of the formation of compounds by neutralization and is representative of inorganic compounds. An example of electron sharing is in the formation of chlorine gas, thus:



Nearly all organic compounds are of the electron sharing or co-valent type, and the simplest hydrocarbon, methane (CH_4), can be represented as:

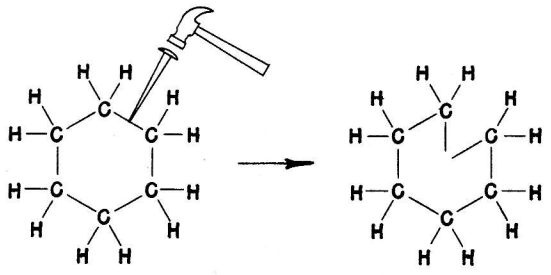


Hydrocarbons formed by the union of carbon and hydrogen are divided or grouped into three main types. These are: paraffinics, naphthenics, and aromatics. These three groups in turn combine in varying percentages to form all the natural petroleum oils known to science. Figures 1 and 1A summarize briefly the chemical structures of typical petroleum hydrocarbons.

All paraffinic hydrocarbon molecules are said to be highly saturated, that is, all the hands of the atoms are occupied, and no hands are left to grasp a corresponding hand of another atom such as oxygen. Thus they are termed stable compounds, and derive their name from the Latin 'parum affinis' meaning, slight affinity. This family of hydrocarbons is desirable in lubricating oils as it resists oxidation or sludge formation. The straight chain paraffins consistsof a string of carbon atoms, with each intermediate carbon carrying two hydrogen atoms, and the terminal carbons at the end of the chain carrying three hydrogen atoms. Branched chain paraffins are similar to the straight chain, but have branches or side chains of additional carbons.

Paraffins containing a total of from 4 to 10 carbons are found in some gasolines, and the longer chain paraffins probably exist in appreciable quantities in lubricating fractions of the paraffinic type crudes. The very high molecular weight paraffins are solids at normal temperatures, and are accordingly paraffin waxes, which must be removed by dewaxing processes in order that the finished lubricating oil will have adequately low pour points. Lubricating oils of this type possess high viscosity indices, low volatility, and optimum stability—all desirable features.

In the naphthenic series, the hydrocarbons are in cyclic or ring form rather than in chains, but as with the paraffins, all the carbon atoms are saturated with hydrogen. The naphthene ring structure has either 5 or 6 carbon atoms, and is found in all petroleum crude oils. Although these hydrocarbons are saturated, there are two less hydrogen atoms in the naphthene than in the paraffin with the corresponding number of carbon atoms, and if one such ring were broken into a straight chain, there would be two free hands available to react with foreign substances, such as oxygen, eg,

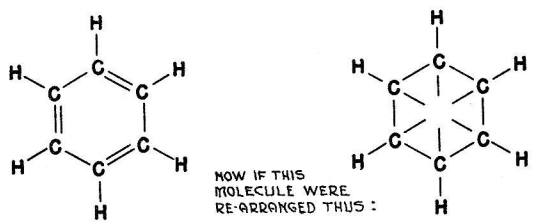


Fortunately, the conditions must be pretty severe for this fracture to take place, and naphthenes are accordingly labelled stable compounds also.

A naphthene molecule may be composed purely of ring compounds such as (c) (d) and (h), or of combinations of naphthene rings and paraffin chains as in (e), (f) and (g). Naphthene hydrocarbons therefore are of several types, depending upon the relative proportions of the

total carbon atoms existing in ring formation to those existing in paraffin chains attached to the rings. The type of naphthene having only a few rings per molecule and a preponderance of the carbon atoms in the form of the long paraffin chains, probably possess the properties which are most desired in lubricating oils. They are quite similar to branched chain paraffins in physical and lubricating properties. Naphthenes having a larger number of rings per molecule and/or paraffin side chains of shorter length have lower viscosity indices and become progressively less desirable as the number of carbon atoms in ring formation increases relative to those in attached paraffin chains.

The third type of hydrocarbon which is found in petroleum crudes in various amounts is the aromatic. The basic aromatic ring, as in (i) and (j), contains 6 carbon atoms (benzene ring), and is similar in this respect to the 6 carbon naphthene ring; but here the similarity ceases. The aromatic compounds are highly unsaturated and complex. In general, there are approximately as many carbon atoms as there are hydrogen, making necessary a double linkage or bond between neighbouring carbon atoms to satisfy the laws of valence, eg, the structural formula for benzene is:



there would be six free hands, eight if the ring were broken as in the case of the naphthene ring, and oxidation, commonly called sludge formation, would take place readily in an oil containing aromatics. The existence of side chains make aromatics even more susceptible to oxidation by a catalytic action. Appropriately, aromatics are termed unstable compounds. They also tend to have low viscosity indices. Aromatics are thus undesirable in lubricating oils, and refining methods are usually directed to reducing their content to the minimum practical limit.

As in the case of naphthenes, the aromatic molecules can be combinations of aromatic rings, naphthene rings, and paraffin chains, as in (k), and the relative amounts of each type will determine the final properties of the oil, and its suitability as a lubricant.

Practically all petroleum oils contain sulphur in amounts ranging from a few tenths of one per cent or less in highly paraffinic oils, up to several per cent in semi-refined asphaltic (naphthenic and aromatic) type crudes. Most of the naturally occurring sulphur in petroleum is in naphthene and aromatic rings, wherein sulphur replaces carbon and is a direct part of the ring structure. In lube oil fractions of high molecular weight, a sulphur content of 0.1 or 0.2% may accordingly be several (20 to 50 or more) per cent of sulphur compounds.

Sulphur in gasoline fractions has a detrimental effect on the knock-ratings of the fuel and also, in the process of combustion, sulphur dioxide is formed which, in the presence of moisture, is very corrosive to engine parts. However, in lube oil fractions, small amounts of natural sulphur compounds function as oxidation inhibitors, and the removal of these natural inhibitors reduces oxidation resistance or stability characteristics. Since modern refining processes tend to remove considerable of the sulphur compounds present in raw oil stocks, it follows that highly refined oils may be deprived of many of their natural inhibitor constituents. However, it is generally accepted that synthetic inhibitor additives are superior in many respects to natural inhibitors for improving stability and oxidation resistance characteristics.

In addition to the major constituents of petroleum oils discussed in the preceding paragraphs, there are small amounts of nitrogen and oxygen compounds. As they are very complex and in low concentrations, very little is known concerning their composition and characteristics. Presumably the nitrogen replaces the carbon in the ring formations in a way similar to sulphur. In well refined oils their concentration is negligible, and they are not usually considered to be of much practical importance or significance. However, the presence of nitrogen compounds in petroleum oils is frequently used as an argument in favour of the theory of the animal origin of petroleum, the decomposition of proteins in animal tissue being considered as the possible source of nitrogen.

Thus we see that petroleum is not a pure compound, but is a complex mixture mainly of three groups, paraffins, naphthenes, and aromatics. However, in each of these groups there are many different compounds, differing in the size of the molecules; that is, differing in the number of carbon atoms contained in the molecule. It is this difference that enables an oil refinery to produce gasolines, solvents, fuels, lubricating oils of various viscosities, waxes and asphalts. The fewer carbon atoms contained in a hydrocarbon, the more volatile that substance is. For example, methane, ethane, and propane, containing one, two, and three carbon

atoms respectively in their molecules are gases at ordinary temperatures. Butane with four carbons is a liquid with a low boiling point as is pentane and hexane, with five and six. With increasing number of carbons, the boiling point rises, and the viscosity increases. The lube oil fractions contain the largest and most complex hydrocarbon molecules found in petroleum crudes. These hydrocarbons may contain from 20 to 70 carbon atoms per molecule, with corresponding molecular weights from about 250 up to 1000 or more. An idea of their complex structure may be gained from the fact that literally millions of different molecular arrangements of carbon and hydrogen are possible in hydrocarbon molecules of this size. Obtained ultimately are asphalts and solids.

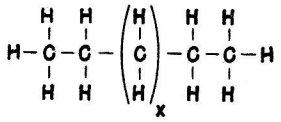
Lubricating oils are often judged on their ability to resist oxidation and this ability is present in paraffins, naphthenes, and aromatics in decreasing amounts in that order. The paraffins are also the most desirable because of their high viscosity indices. However, by careful refining methods, crudes of a composition apparently unsatisfactory for lubricating oils can be made into excellent lubricants, but that is another story.

It is obvious therefore, that the composition of the crude oil is a big factor in determining the quality of the refined oil, and the method by which the crude oil will be refined. The major difference between the crude oils produced in various geographic fields is due to the different proportion of these three groups. For example, the typical composition of Pennsylvania crude is 70% paraffins, 25% naphthenes, and 5% aromatics, whereas that for 'Coastal' or California crude is 85% naphthenes, 10% paraffins, and 5% aromatics.

In conclusion we may say that the petroleum hydrocarbons are very similar to the human race. All human beings, regardless of race, colour, or creed, are made up of two essential 'elements'; namely flesh and bone (comparable to carbon and hydrogen in oil). Human beings, in turn, are divided into large groups or races —comparable to paraffins, naphthenes, and aromatics in oil. Naturally the individual members of each of these races have varying characteristics, (as do the members of the hydrocarbon groups) they look, behave, and react differently according to their geographic origin, refinement, and environment. This analogy explains why petroleum products with apparently the same physical and chemical properties may behave differently under seemingly similar situations.

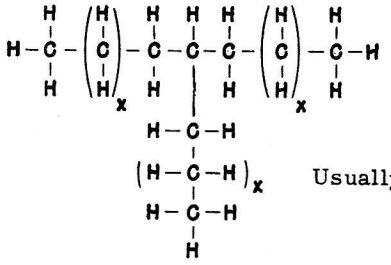
EXAMPLES OF CHEMICAL STRUCTURE OF TYPICAL PETROLEUM HYDROCARBONS

(a) STRAIGHT CHAIN PARAFFIN:



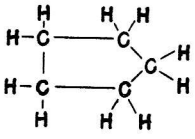
Usually represented as: C_x

(b) BRANCHED CHAIN PARAFFIN:



Usually represented as: $C_x-\underset{\underset{C_x}{|}}{C}-C_x$

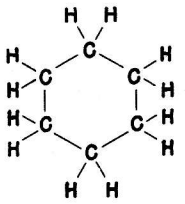
(c) 5 CARBON NAPHTHENE RING:



Usually represented as:

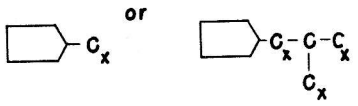
Figure I

(d) 6 CARBON NAPHTHENE RING:

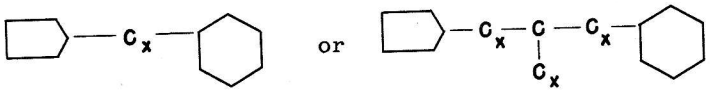


Usually represented as:

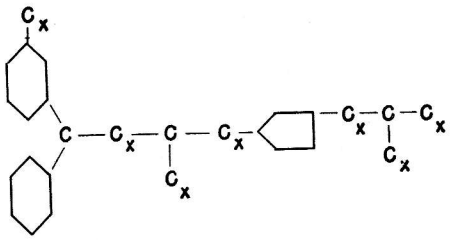
(e) NAPHTHENE RING WITH PARAFFIN SIDE CHAIN:



(f) NAPHTHENE RINGS LINKED BY PARAFFIN CHAINS:

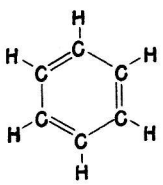


(g) POLY NAPHTHENE WITH PARAFFIN LINKAGE AND SIDE CHAINS:



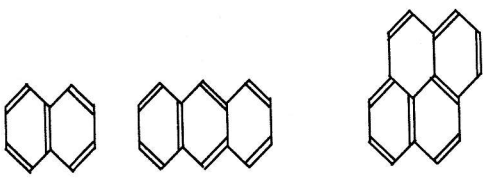
(h) FUSED NAPHTHENE RINGS:

(i) AROMATIC RING:



Usually represented as:

(j) FUSED AROMATIC RINGS:



(k) MIXED AROMATIC-NAPHTHENE RINGS WITH PARAFFIN LINKAGE AND/OR SIDE CHAINS:

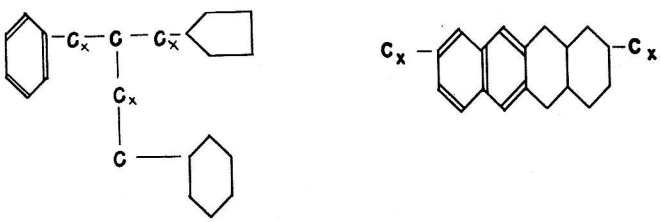


Figure IA

School Days

One officer and five teams of the RCEME School Rifle Association attended the Ontario Rifle Association Service Rifle Matches at Long Branch on 7 Oct 50. The shoot took place in perfect weather and was well attended by teams and representatives from many Reserve Force units as well as from 204 Base Workshop, 27 COD, and Trenton Air Station.

One team won second prize in the team championships and, of the twenty-one men entering the competition, thirteen came into the prize money. These were: Capt J. M. Pinder-Moss, WOI A. S. Etter, Sgt N. E. Mahood, Cpl G. E. R. Cain, Ptes M. W. Dixon; G. H. Hague (Special Force); N. N. Hirsch; R. Morton; J. J. Smith· J. A. Woodside; D. B. Williams and Spr F. C. Walters (Special Force attached to 191 Cdn Inf Bde).

The School team travelled in style to the meet, RCASC supplying a bus and the men's mess supplying the rations to those members of the team not living out.

Since it was a long weekend for the School, no training time was lost.

Cfn E. H. Martin receiving the Outstanding Individual Trophy from Major Thompson.

On 31 Aug 50 in a steady drizzle of rain, under dark grey clouds, the RCEME School held their annual Field Day.

The drizzle persisted throughout the entire afternoon and evening causing the cancellation of the running high jump and a softball game. It also left the track in a slippery condition and the field greasy and muddy, making poor traction and slow take off in the field events.

Although the time recordings for some of the events reflect these very unfavourable conditions, a marked improvement over last year's is noted in others.

In view of all this, much credit and praise should be given to the various contestants, officials and spectators for their good showing and perseverance in making the day a success.

The School personnel were divided into five sections due to the fact that the strengths of certain companies were not sufficient for them to field a complete team.

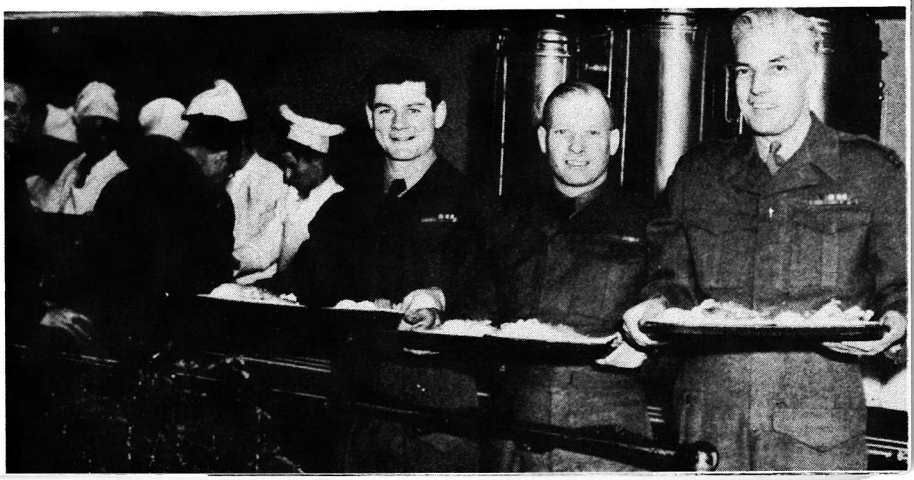
The RCEME School Challenge Trophy offered for annual company competition was taken by the COTC entry with a total of 43 points out of a possible 70. The combined efforts of Electrical and Artisan Coys gave them a close second with 39 points, Admin and Armt Coys teamed up for third place, leaving Vehicle Coy with fourth position and C & GMT Coy fifth.

The Tug of War Trophy after a series of eliminations was taken by the Electronic and Artisan heavers, making it the second year in succession for them to hold the trophy.

The outstanding individual trophy was taken by Cfn E.H. Martin with two firsts and two seconds, for a total of 16 points.

The presentations were made by Major G.W. Thompson on 9 Sep 50 immediately following the CO's parade. Trophy cups were presented to first place winners, and medals of merit went to second and third place contestants.

* * * * *



Officers and NCOs serve the men on Christmas Day; l to r - Sgt R. J. Finston (extreme left); W O II P. G. Vyvyan; WO II E. O. Wright; and WOI F. Bridges.

Canadian Staging Camp

by WOII J.E. BREWSTER, RCEME

At an undisclosed place on an unspecified date there was a gathering of unnumbered all ranks personnel for what was revealed as a peaceful invasion of our neighbour to the south. We were on our way to establish the Canadian Staging Camp for Canada's United Nations Force, at Fort Lewis in the state of Washington. The date of this historical event was Thanksgiving Day 1950 (9 Oct).

As that eventful morning dawned in Vancouver, few of us in the assembled personnel realized the significance of the event due to the rush of crawling out at the unheard of hour of 5 AM (unheard of that is to us on temporary duty from AHQ); having an early breakfast; turning in blankets; falling in on early parade and then waiting two hours while a new nominal roll was prepared for the US Customs. With such an auspicious start the Army routine was in the groove and the success of the exercise was assured.

The movement southward was by convoy. After crossing the invisible line a stop was made at Blaine, Washington, where some of us had our first chance at '3.2 water' by the glass and blended smokes. As we were not encumbered with bows and arrows, skiis, or holding a powwow, the good people welcomed us with peace offerings of cigarettes and chocolate bars, which were a welcome addition to our picnic lunch consumed while on the move.

After retrieving our hearts from our stomachs, caused by the convoy squeezing through city traffic escorted by State and City Highway Patrols, we arrived at North Fort Lewis, accompanied by the rain, in time for the official welcome. Some of the personnel comprising the advance party maintain that RCEME were practicing recovery when they hooked onto a cloud over Vancouver and towed it all the way to Fort Lewis. Anyway it rained during part of every day except six of the 52 they spent at Fort Lewis. On Nov 30 when most of the Staging Camp Staff returned north, the weatherman tried to make amends by supplying snow to reacclimatize the Canadians.

Brigadier General Hayden, Acting Commanding General of Fort Lewis and Col C.R. Boehm, DME, who was Commandant of the Staging Camp, welcomed us on arrival. As Major W.A. Campbell (DADME) turned the parade over to the Commanding General comments were heard on the smart turnout of the troops. This was very commendable as they were from practically every Corps and Command in Canada, and was in large measure due to the example set by the Camp RSM, WOI M.J. (Paddy) Fallon, RCAC. After a short ceremony we thankfully

Col Boehm and Brig Gen Hayden inspecting the color party.

WOsI Paddy Fallon and Herb Popkin.

were free to draw blankets and stake squatters' rights to our new homes. The first impression of our quarters were not too favourable and in comparison with Canadian standards left a lot to be desired. Some of the grumbling was no doubt due to the fact that most of us had become accustomed to living at home during the last few years and any barrack life would have irked. Canadian troops stationed in Canada should appreciate the minor comforts provided in their own barracks.

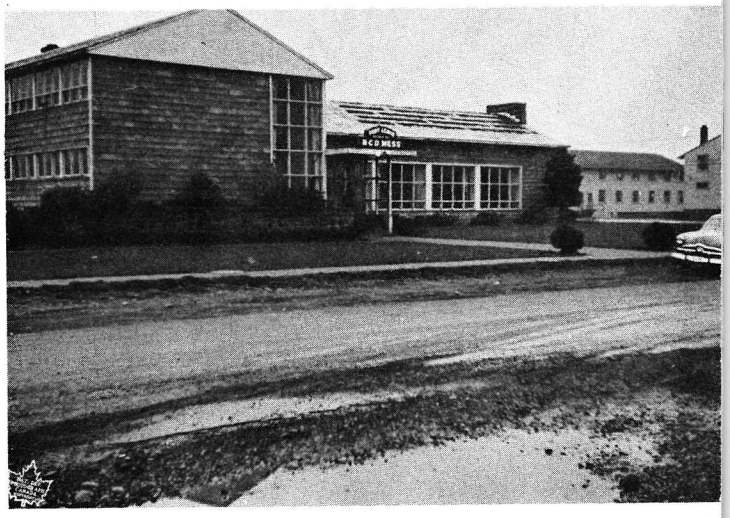
Our first two meals were provided by the courtesy of the US Army as our kitchens were not yet set up. During the evening meal General Hayden made an unofficial visit and extended a welcome for all ranks to make full use of all Service Clubs, Messes and other facilities provided for the US troops on the Post.

Without violating security regulations a few facts concerning Fort Lewis may be of interest to the reader. Originally called Camp Lewis, it was named in honour of Capt Meriwether Lewis, an American explorer and one time private secretary to President Jefferson. Capt Lewis became famous as the leader of the Lewis-Clarke expedition and the first explorer to cross the American continent north of Mexico. The party which he led travelled nearly 4000 miles from St. Louis, Missouri, and reached the mouth of the Columbia River on Nov 15, 1805. After spending the winter on the Pacific coast they returned east the next year, making valuable scientific observations and collections. In 1917 the citizens of the county presented the land to the US Government as a military reservation. In approximately four months was completed the World War I cantonment: a city of buildings, lighted, heated, and ready for occupancy. In 1927 the camp was designated a permanent Army Post and renamed Fort Lewis.

The Post is situated just to the west of Mount Rainier, whose crest rises to a height of 14,408 feet. Tacoma, one of the state's largest cities, and Olympia, the capital, are approximately 15 miles away, with Seattle only 60 miles to the north on Highway No. 99.

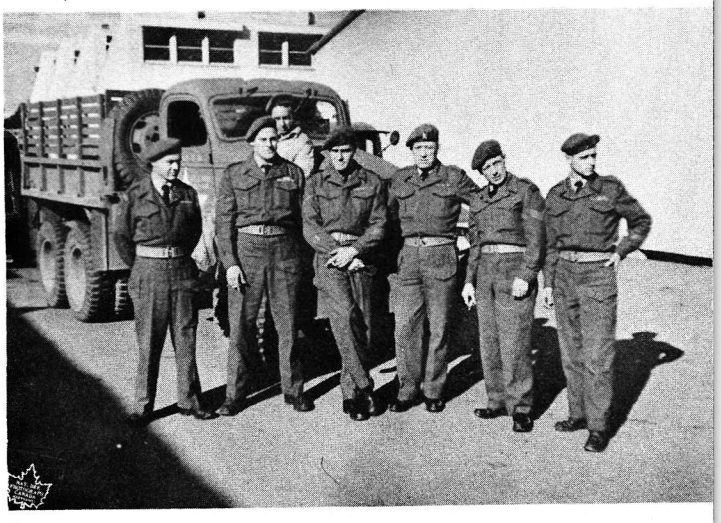
The camp is the largest military reservation in the Pacific Northwest and ranks among the finest in the United States. The topography provides open plains for manoeuvring and wooded areas for concealed troop movements. The post provides banking facilities—including slot machines. There is a bus service through the camp area, and to Tacoma, for a nominal fee. There are post chapels for all denominations with hours of workshop notified each week in the post Daily Bulletin. Dry cleaning and minor repair establishments are provided and the service is comparable to civilian establishments in Canada. Laundry service is performed by the post laundry.

Fort Lewis



Fort Lewis' NCO Mess.

Left to right; Cfn F. Buckert, L/Cpl K. D. Gork, L/Cpl A. R. Kellington, Cpl Band (RCOC), Sgt T. M. Fairbairn, Cfn A. P. Flegg and Cpl Ruggles (in coveralls).



Enlisted personnel may have 25 pieces of laundry done for a nominal fee of $2.00 per month. Officers are charged slightly more. Post 'exchanges' more commonly known as PX, are provided where all ranks may purchase a wide range of goods at a reduced price. The price is wholesale plus 7 percent with state or local taxes as applicable. Profits from all facilities provided by the post are used to provide recreational and other facilities. There are guest houses where wives may visit for three days. Seven theatres are open where all ranks may view the latest pictures at a reduced price. To detail the complete facilities available on the post would require nearly as many words as one issue of the RCEME Quarterly; but to give the reader an idea, Fort Lewis is known as the fourth largest city in the State of Washington.

As this article is for a RCEME publication, omission of other Corps activities should not leave the impression that the exercise was strictly a RCEME show. Nearly all Corps were represented and carried out their duties creditably.

The Staging Camp AWD was composed of thirty all ranks drawn from AHQ and units from Halifax to Whitehorse, as well as personnel from the Armoured and Ordnance Corps. With such a representation sectional preferences were inevitable which often started heated discussions but also fostered good fellowship. At times Capt Stan Tait, Lieut Hurst, or WOI Ed Ellik had to take a hand and gently (?) remind everyone that there was a job to be done. WOI Ellik was especially adept at such reminders and on one or two occasions the PA system could have been dispensed with.

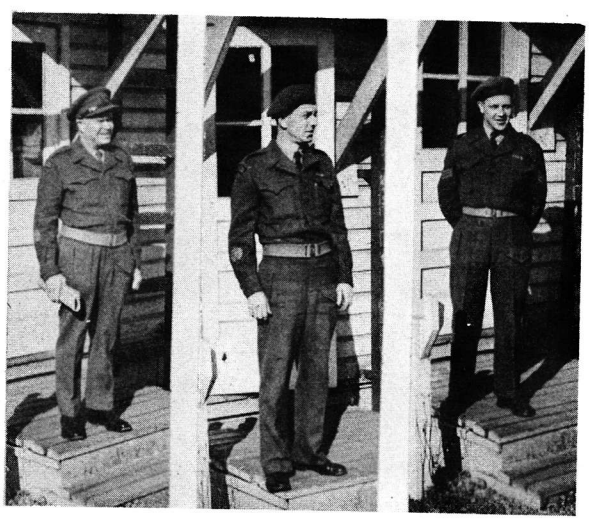
The AWD's job was to modify American type vehicles, adapting them to the Canadian role. The preliminary information supplied by DVD, CSRDE, and other directorates at AHQ was very useful as a guide but due to minor differences in nearly every type of vehicle, as well as policy changes, the well known RCEME versatility was one of the main assets.

The presence of Col Boehm, as Camp Commandant, Lt-Col R.H. Ramsay as AA&QMG and Major W.A. Campbell as DADME—with WOI Herb Popkin in charge of Headquarters clerks—was a contributing factor in the efficient function of the AWD. In most cases slight changes pertaining to modifications were dealt with as they arose which helped RCEME Services meet their time schedule commitments.

All technical vehicles required some modifications, as could be expected when US Army vehicles are to be used for Canadian equipment. These ranged from minor ones, such as the addition of Cdn AFG 1098 items to the American load on the vehicle, to complete reworking of bodies to adapt them for specific roles. Most of the tradesmen were vehicle mechanics when they started the modification program but by the time the vehicles were completed quite a few had a good working knowledge of various allied trades. A very good example of this versatility required by all personnel was the supervising by WOII Rippengale (Armt Art Fd) of wireless, vehicle and various other modifications. WOII Edworthy (Tels Art Wrls) besides working on wireless installations was required to supervise various other types of modifications.

Because of the abrupt and extensive change of plans when the exercise was just commencing a large workload of depreserving, preparation for issue, and carrying out minor repairs on equipments was also taken on by the AWD. As no Canadian spare parts section was established up to this time some of the senior NCOs rendered valuable service in securing spare parts through US channels. Arrangements were made by the DADME (a former Senior Canadian Liaison officer at Detroit Arsenals) for the setting up and efficient operation of these channels.

The AWD was very fortunate in having three sergeants from the Armoured Corps on their strength. Sgts St. Germain, Burns and Trinka, besides working on modifications were called on to help Ordnance services unload armoured and other vehicles. As the roads were all hard top and the camp railroad sidings two to five miles from the Ordnance vehicle park, heavy tracked vehicles had to be transported. A very efficient system was set up using a crane to transfer equipments from railway cars direct to trailers,



Left to right:
WOI Ed Ellik
WOII G.S. Rippengale
Sgt E.C. Price

(Photos by WOII H.T. Edworthy)

and another to offload trailers at the vehicle park.

Although the AWD worked long hours (some evenings and weekends) we took advantage of all recreational facilities. Scenic tours by army bus included Mount Rainier National Park and a trip was also made to the shores of the wide and rolling Pacific Ocean.

Personnel when not detailed for orderly duties or as Service Corps dispatchers could usually be found in the NCO's mess or other ranks' canteen. The NCO's mess is much different to Canadian messes, as it is actually only a recreational club. Lance-corporals and warrant officers Class II were equally welcome. The WOsI used the officers' mess. One of the drawing cards at the NCO's mess was free draft beer once a week which was paid for by the one-armed bandits (slot machines). Speaking of these machines it is a fascinating if expensive pastime watching the lemons, oranges, bells and bars go round. It would be a good mathematical problem for RCEME types to figure out the odds built into such machines. Unfortunately, after a few glasses of 3.2 the odds do not seem important.

As we were quartered in a section of the American Camp the hours of duty were modified to conform as closely as possible to the US Army schedule. One of the novel—to us—features of their system was the way in which the various hours, reveilles and lights-out were sounded. Because of a flexible schedule to compensate for the camp activities reveilles varied at times from 4 AM to 7 AM whereas lights out started at 21.30 hours in certain portions of the US section and ran on until 23.00 hours in the Canadian section. All US calls, whether by transcription or for Private Joe Doakes to report to the orderly room, were heard all over the North Fort, thanks to the installation of a PA system in US barracks and orderly rooms.

Part Three orders were published daily but when official notification of the return to Canada was received, a final scramble was made to buy presents from the PX for the wives and sweethearts waiting expectantly at home. As all personnel had been on duty in the US over the required customs time, no trouble was experienced in bringing back the odd present. The AWD personnel who remained one week longer than the main party to carry on until 25 CS Workshop was functioning, were envious of the fellows leaving, but as they had developed web feet by this time another week could not make any material difference.

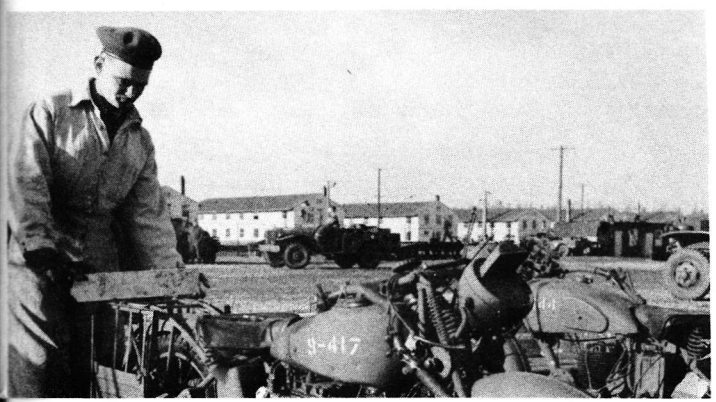
As soldiers we should know that our order of existence may be disrupted at any time in the normal course of duty. To grumble at such disruption is both the soldier's prerogative and his safety valve. Let us say then that while some aspects of the exercise were perhaps a bit hard to take, we would go willingly as well as dutifully if required again for a similar task.

191 INFANTRY WORKSHOP

Tuning up Jeeps.

Cfn J. Brown and B. Nickerson.

Cfn E. Simpson uncrating Norton MC.



Gassing Jeeps from tank truck.

RCEME SERVICES ON

SUNDOG I

by CAPT C.G. PROVAN RCEME

RCEME AWD on Ex Sun Dog I. Front row: Sgt Wilson, WOI Brown, Cfn Scharf, WOII James, Capt Provan. Back row: Cfn Young, L/Cpl Mitchell, Sgt Gardner, Cpl Coughlin. Cfn Beatty, who was recovering from 'ice-worm' bite, is missing from photo.

RCEME participation in the Winter Exercise Sun Dog I during the winter of 1949-50 consisted of an Advanced Workshop Detachment of ten all ranks. The AWD was responsible for the 2nd-4th echelon repairs of telecom equipment, and the recovery and repair of the vehicles and other equipments used on the exercise.

Although the exercise itself lasted only for one month during the latter part of the winter, the preparation and training for it started early in September 49 with a course at the Caterpillar Tractor Company, Peoria, Illinois, worked through a Penguin course and an Astro-navigation course, and ended with an Arctic Indoctrination course at Camp Shilo.

On 16 January 50 all personnel of the AWD gathered at Fort Churchill, Manitoba, and started drawing stores and equipment and preparing them for the exercise.

The AWD was broken down into two subunits; a heavy section, consisting of a Caterpillar Tractor D7, a tels wannegan, a general workshop wannegan, and two Otaco 10 ton cargo sleds, manned by six members of the AWD; and a light section, consisting of a Penguin and four light 10 cwt sleds manned by the remaining members. Exchanges were made during the exercise between personnel of the sections, so that almost all had some experience with both the light section and the heavy section.

Workshop set up in the Arctic, showing a shelter armoured corps and a five-man tent.

Repairs were carried out on vehicle equipments and on tels equipment. Penguin and sled repairs accounted for most of the vehicle work during the exercise.

Repairs to the Cadillac engine of the Penguin were mainly replacing ignition system components, starting-motors, and fan belts; with some work being done on generating and cooling systems. Suspension repairs carried out were the replacing of rear suspension springs, tracks, and one bogie wheel. No repairs were required to Penguin tires, as the pneumatic tires froze during the first few hours they were outside the workshop, and retained that shape, regardless of air pressure, for the remainder of the exercise. Cross chains were the only components which broke on the sleds, and these were either replaced, or the broken ones repaired by gas welding. More than 50 electronic equipments were repaired in the tels wannegan. These repairs ranged from a broken switch on a WS 88 to a major overhaul of a WS 52 chassis.

Two types of workshop shelters were used by RCEME on the exercise. One was the Shelter LAD, a canvas covered wooden frame about 12 feet long and 9 feet wide, and the other was a Shelter Armoured Corps, a steel collapsible frame covered by 500 pounds of canvas, about 26 feet long and 18 feet wide. Both shelters were difficult to erect, and were not used to any great extent. Accordingly most of the work was

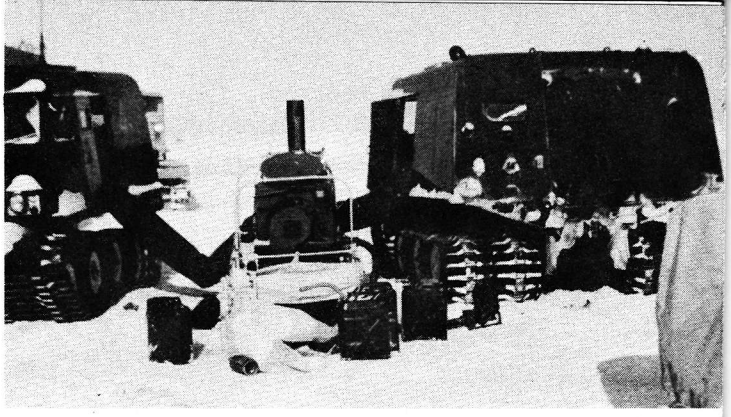
carried out in the open in temperatures ranging from -10°F to -45°F, and with winds up to a velocity of 40 mph.

This is not as difficult as it may sound thanks to the Herman Nelson heater. This apparatus is a motor driven fan which forces air around a gasoline burning heat exchanger and out through two long flexible canvas tubes. This hot air is directed on the component to be repaired and on the mechanic and makes working conditions fairly comfortable, especially when working on a Penguin engine with the added shelter of the Penguin body. Occasions did arise when 'Herman' was 'indisposed', and then work had to be carried on without heat, even to the replacing of ignition contacts with bare hands. Work without heat is uncomfortable, but no permanent ill effects were suffered

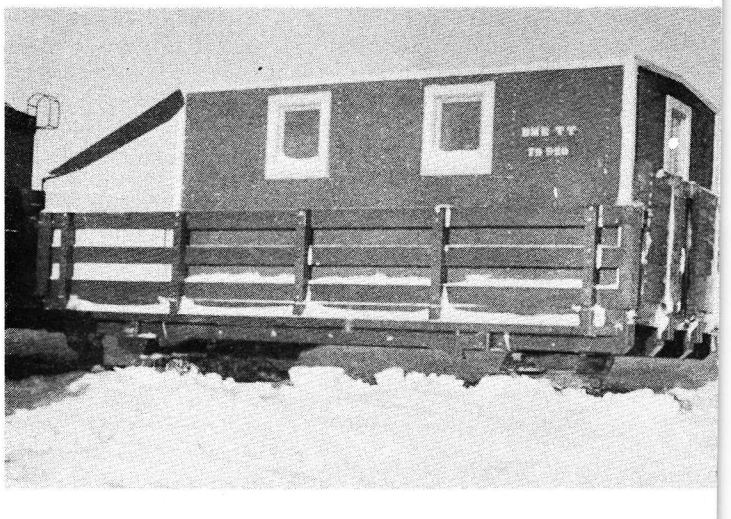
One of the worst aspects of Arctic life is cooking! Three types of rations were consumed during the exercise: emergency; 5 in 1; and fresh rations — and a characteristic of all three was the difficulty of preparing them for consumption. Most of this difficulty is directly due to the scarcity of water, which is obtained by melting snow in a pot over a gasoline stove. The greatest help in the cooking department was given by the commercial type pressure cooker, which, requiring a minimum of water, thawed and heated food in about one half hour. All members of the detachment had a turn at cooking, and they all proved they could open a can and boil water with the best of chefs.

A living wannegan was built at Churchill by the AWD with the assistance of 223 Workshop, Churchill. When the heavy and light sections were together, all personnel had their meals prepared for them by Cfn Scharf, (head chef of the famous 'Atomic Plaza') and ate in relative comfort at the table in the wannegan. In addition to being a 'diner', this wannegan was used as a workshop, for spare parts storage, and as a bunkhouse to sleep six men.

An Arctic 5-man tent was used by the light section when it was working away from the heavy section. This tent will easily accommodate five men who have lived in the tent for a short time, but is too small for even two men who are using it for the first time. However, once you have found where all the equipment is



'Herman' heating two Penguins. That is a Briggs and Stratton engine driving the fan on this end of the heater. Note the canvas ducts.



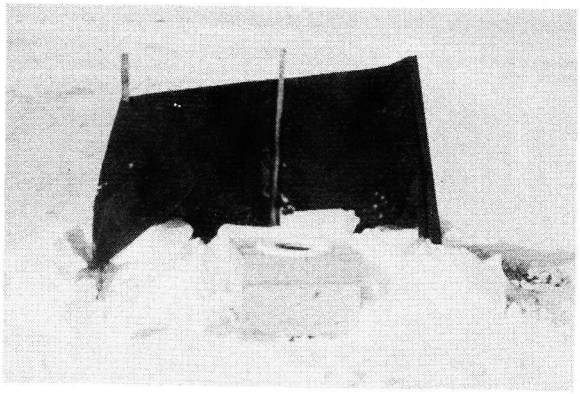
General Workshop Wannegan.

Arctic five-man tent.

Digging out a stuck Penguin.

stored, and everyone learns enough to keep out of the way of the cook, the tent seems to double its size. They are well designed tents. When well dug into the snow, and with caribou skins on the floor, they can be quickly heated to a comfortable degree with two small Coleman gasoline burning stoves. The main hardship encountered living in a tent in the Arctic is suffered in the morning by the unfortunate soul who must climb out of a warm sleeping bag into the cold, struggle with frozen stoves and gasoline which will not burn, and make breakfast, with his mates passing uncomplimentary remarks about him in particular and the Arctic in general from their snug positions while waiting for the tent to warm up and for their morning cup of tea.

The AWD was accompanied this year by Major J.W. Armstrong, REME, a British liaison officer in Canada for the winter months. Although an observer, Major Armstrong did his full share of the work. One of his more notable achievements was the construction each morning of an apparatus to allow some comfort during the performance of one of the natural functions at forty degrees below zero. We were glad to have him with us and show him what we could of Arctic life.



A REME design—'Specialists' to note.

On the whole the winter spent on Exercise Sun Dog I was enjoyed by all members of the AWD. There were many good times, a very few unpleasant moments, and a great deal of hard work. Much was learned and many new friendships were made. It was proved that there is nothing in the Arctic barrens to fear — as long as a man follows instructions and uses his head — and that any RCEME tradesman can be sent to the Arctic and in a very few weeks become completely acclimatized.

35 BELOW - WIND 30 MPH

1

2

1. Sgt Wilson and Cfn Young; 2. Sgt Gardner and light section tent; 3. Major Armstrong, Capt Provan and Cfn Young; 4. WO II James.

3

4

VISIT BY LT COL L.G. BARNES MBE REME

On 13 Sep 1950, the Directorate of Mechanical Engineering, AHQ, was honoured by the presence of Lt Col L.G. Barnes, MBE, OC REME Scales Branch.

The objects of his visit were manifold but can be briefly stated as follows: (a) to assess the overall situation with a view to the setting-up of a Canadian Scaling Section along the lines of its British counterpart; (b) to acquaint all concerned with the importance and implications of spare parts scaling and (c) to dispel the old idea that British wit and humour is invariably dry.

It was obvious from the start that he was most highly qualified to undertake such a task, for his knowledge of scaling is founded on an engineering background, a vast amount of war-time experience and extensive travel, and he has a great sense of humour.

Starting out as a RASC officer, Lt Col Barnes transferred to REME at its inception. His wartime experience with REME included big jobs and took him to all the important theaters of war. He was OC REME Base Workshop in Naples (largest in Commonwealth armies with peak of 12000 employees) after Italy surrendered and commanded the Base Workshop in Austria in the British Army of Occupation until the workshop was disbanded.

Lt Col Barnes was recalled home to become OC REME Scales Branch. Here he is responsible for all spare parts scales pertinent to A and B vehicles and earth-moving equipment, and his job takes him to every corner of the earth where British outposts and repair units exist.

While in Canada, this authority on scaling visited 25 and 27 CODs where discussions with the senior RCOC and RCEME officers revealed that no major disparities exist between the British and Canadian organizations. Further discussions were held with the QMG, VQMG and representatives of DME and DOS, and scaling policies were explained.

His last talk to the scaling staff was an hour and a half lecture, which everybody thoroughly enjoyed, on the many implications and details of spare parts scaling. There is no doubt that his information and advice will be invaluable in setting up our own scaling organization, and his vast knowledge and ready wit will remain as very pleasant memories to his many Canadian friends.

(Continued from Page 3)

tick and to tell the rest of the Corps about it.

In our news reporting section we haven't done one tenth of what we might: partly through lack of coverage and partly through just plain lack of thought by those making the news. In fact, this is one of our big headaches. Constantly, through the press clipping service, we read interesting news stories of Reserve Force doings, but we get only a dribble of unit news. Let us work together in the new year to increase this flow of stories of Corps activities. With photographs please! This could apply also to officers of the Supplementary Reserve who are doing worthwhile things in the engineering world and would like to take the time to tell us about them.

One of the important features has been the WHO'S WHERE pages, where one could find the location of all ranks above sergeant. This will be continued and will probably include Reserve Force personnel and perhaps Sup Reserve names and addresses. If we find it possible more NCO ranks will be added.

In planning the original Quarterly layout, we set aside two pages for Letters to the Editor. We even thought there would be so many criticisms and helpful suggestions that perhaps more space than that would be needed. Well, either we've been above criticism or our readers feel that because the magazine costs them nothing they should accept it in silence. May we suggest that in this New Year you resolve to write and tell us what you like or dislike about your RCEME Quarterly?

OPERATION 'SCALING'

With a special force, one expects a special organization. With a brigade as a completely self-contained field force, some special problems must arise. They did—and the RCEME scaling aspect was no exception.

The RCEME Scaling Section, relatively new, within the Workshop Group of DME, was called upon to prepare the scales required for the maintenance of all the equipment in the Special Force. Such scales were to cover the necessary tools and test equipment throughout the RCEME repair organizations and also the requisite number of spare parts, per set number of equipments, to maintain the force for a definite period. The spare parts scales were to indicate distribution through the various echelons of repair and ordnance supply. All scales were to be completed within a month.

When given this task, somewhere about the beginning of August, the scaling staff consisted of Major H. Brown, Lieut B.H. Goodings and WOI J. Tatham at DME; Capt W.J. Branston and WOII D. White at 27 COD London and WOI G. Swallow at 25 COD Montreal. To complicate the situation, WOI Tatham was on leave at the west coast.

It was immediately apparent that the scope of the task was beyond the capacity of the AHQ staff; so the sub-sections and artificers in the various trades were called in to assess the situation. A speedy conference on 'ways and means' resulted in requests for additional help being sent out to Central and Quebec Commands. By 6 Sep, the following personnel had arrived at DME to assist in the task:

208 Workshop, Ottawa	
WOII Clarke, D.L.	Sgt Babb, C.H.F.
WOII Maguire, G.	Sgt McKoen, J.R.
S/Sgt Salisbury, W.K.	Sgt Nicol, W.
207 Workshop, Kingston	
WOII Holden, C.	Sgt Holt, J.C.
S/Sgt Smith, D.B.	
3 Coy RCEME, Petawawa	
WOII Leach, F.H. (now in Korea)	
Vehicle Proving Ground, Ottawa	
Cpl Crowell, C.L.	
3 Sec A&T, Kingston	
WOI Fraser, G.	Sgt Sullivan, M.S.
WOII Kelly, H.	
210 Workshop, Picton	
Cpl Brooks, S.	
Tels Insp Team, 2 Coy RCEME	
Capt Robinson, M.R.	WOII Perrin, W.G.
WOII Burton, R.	L/Cpl Barker, N.
WOII Kendall, J.	Cfn Thompson, G.
202 Base Workshop, Montreal	
WOI Sloan, H.	Cpl Labrosse, J.M.
Sgt Charest, R.C.H.	Cpl Rivet, J.G.
206 Workshop, Toronto	
Cpl McCarthy, J.	
204 Base Workshop, London	
WOII Langford, W.H.	Cpl Andrew, W.J.
Sgt Allen, W.G.	L/Cpl Doherty, W.
228 Workshop, Hagersville	
Sgt Young, R.	
226 Workshop, Montreal	
WOII Webb, A.P.B.	S/Sgt Doherty, S.F.
A&T 61 LAA, Valleyfield	
Cpl Squires, E.H.	
4 Sec A&T, Val Cartier	
Sgt Mandeville, E.	
DME, Ottawa	
WOII Rippengale, G.S.	S/Sgt Howard, O.
WOII Wright, W.A.	S/Sgt Schleihauf, G.

It is natural that difficulties and hardships result from such sudden moves and resultant 'beefs' can be expected. However, all were willing to make sacrifices in the interests of the common task and to face the situation with a will and determination to complete the job in the required time. The following story exemplifies this spirit.

One of the new 'scaling' recruits, apparently from an inspection staff, commented: "We worked long hours—even nights and Sundays—so we could get finished up and get back home in time for a short holiday before the kids went back to school. I, personally, had just got away on leave, all set for the long-awaited two weeks, when what do you think happened? You guessed it! Leave cancelled and ordered to report to Ottawa on temporary duty for three weeks or a month. Oh well, there's always another summer—I hope."

Having segregated this cosmopolitan group into their respective trades and experiences, they were made up into teams of two to four men. Each team was given a specific scale to prepare—the tools for the vehicle recovery of the infantry workshop—expendable stores—spare parts for a 17 pdr M10 or a Waltham watch—or for any one of a hundred odd other requirements.

The general procedure was first to collect all available relevant data, including such publications as parts lists, workshop manuals, CAEMEIs, British scales, etc. To all this was added the personal peace and wartime experience

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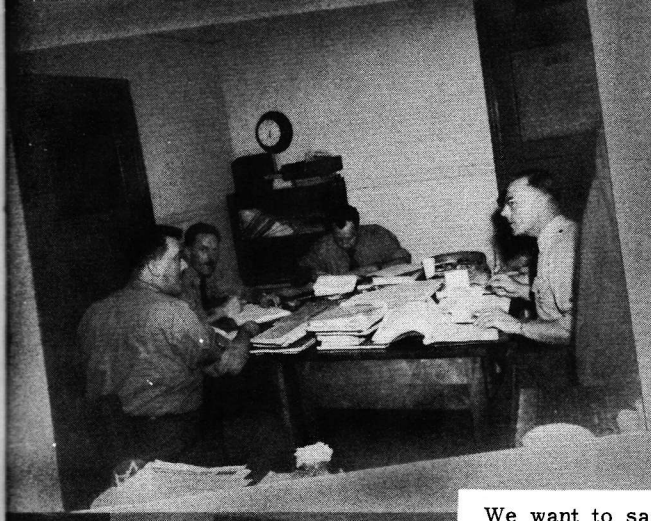
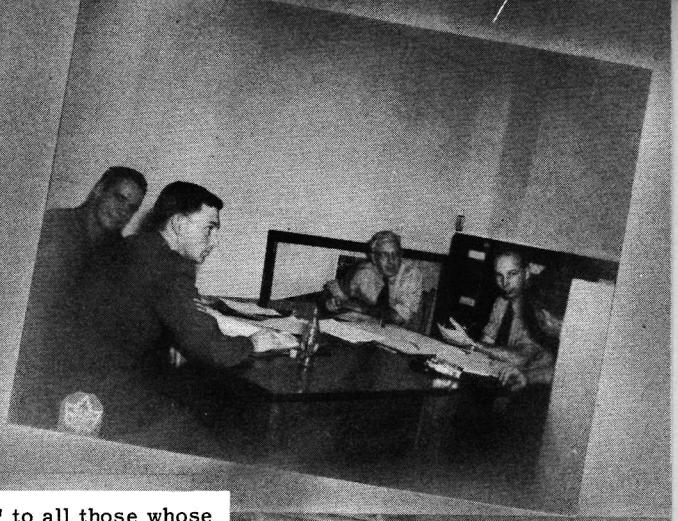




We want to say 'thank you' to all those whose willing assistance helped us attain the final goal:

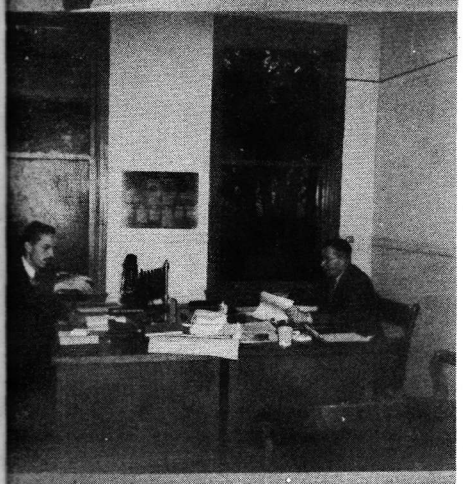
To the new scaling recruits, and civilian typists, who gave up nights and week-ends—often working 58 hours per week—and finished the job in the minimum of time:

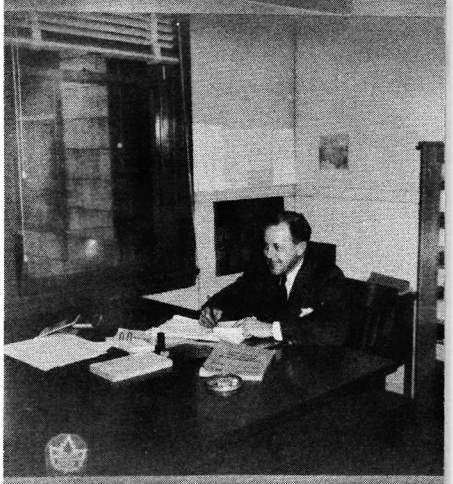
To the OsC of the field who, by sending their best artificers, sacrificed workshop production and control in the interests of the common task;

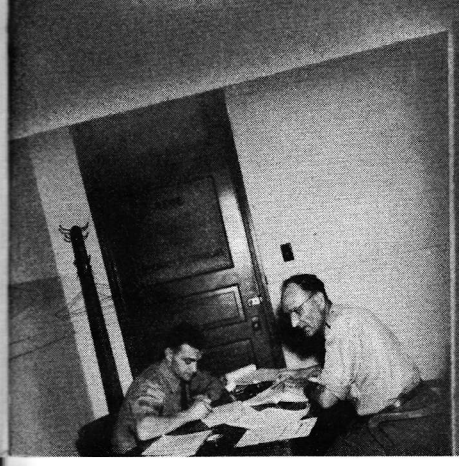
To the various Directorates—with particular reference to DOS—who endeavored, through the loan of publications, time and personnel, to lighten the load for the scaling project; and finally,

To Lt Col L.G. Barnes, MBE, OC REME Scales Branch, Chilwell, England, who gave much-needed help and encouragement.

—Major H. Brown
RCEME Scaling Section







Wainwright

SUMMER CAMP

by CAPT C. HEATH, 38 Tech Sqn RCEME

The train backed slowly into the siding behind the Ordnance building. The little groups of waiting men in bush clothing began to come to life, and prepared to receive its contents. It shuddered to a stop, the well-kitted BC bunch poured out. Camp was officially on.

The combined A&T staffs from BC Area and Western Command Areas had been in this paradise amongst the hills (sandhills that is!) for the previous ten days and a few members of the Calgary and Edmonton units had also arrived early to help out a bit. Having vigorously cleaned all the 'M' and 'A' trucks and hauled loads of this and that at the gentle insistance of the sergeant major, only to have to move them somewhere else the day after, they were only too anxious to see how this business of training was to progress. Also they wanted to see the reactions of the people from 'The Coast' to this gently rolling rangeland, covered with sage and wild roses. And how they reacted! As the trucks brought them to the big drill hall from the siding, one salty looking individual stuck out his head, looked around and said,

"Well, no matter how you look at it, I guess I'll have to admit that this is Canada!"

"Yeah, what a swell place for a POW camp!"

"G'wan, Salmonbelly, this is the first time in your life that you have ever seen so much sky all in one place."

"Sure, an' so dam' little underneath it too—no wonder so many of your prairie people come out to the coast to die."

However, in spite of this good-natured bantering, the group were soon settled in their quarters—an H-hut with a view. If you stuck your head out of the back door you could see the camp from the RCEME workshop and the Domex hut to the vehicle pool and tank park at the other end of the parade square. This parade square at the time resembled any other parade square in that it was flat, the Engineers having removed the sand dunes drifted in a few days previously, on the vague supposition that the place could be used for marching.

The next morning, then, filled with the stories of those who had been there for the last week and encouraged by the excellent coats of tan and sunburn displayed by all, 65 odd RCEME people from Alberta and BC marched smartly to their places in the GOC's parade. Shortly afterwards, training began.

All that day the clouds gathered and the temperature dropped and the next day, as the rain poured down, faces fell with it. The only answer to this of course was to scrap the syllabus and, sparked by the enthusiastic co-operation of the Reserve Force NCOs, to commence corrective measures. Training films were shown and a driver qualification course was begun with a talk by Sergeant Major Nicholson from Vancouver. Driving in the rain found more takers than vehicles to train with and the crowning achievement of the lot was that of Sgt Hetherington with his recovery class. They spent the whole day out with the Mack wrecker and that afternoon, although soaked and covered with mud, none wished to come back to camp for supper.

It seemed that WOII Burke was the protagonist for many pranks, and the day on the rifle range provided the first opportunity for a good-natured laugh at his expense. As has ever been the case, a few of the new recruits found their muscles not very obedient when the time came to pull the trigger. When this happened, the SM would stride over, and with a grin take the rifle and load a round. Then a quick message to the butts to "Raise that target again, Charlie, the sergeant major is goind to shoot." A shot would ring out, a bull would be signalled and as he handed back the weapon with a dead pan expression he would say,

"That rifle's alright, go ahead and try it again."

After this had happened a few times Mr Burke became pretty pleased with himself, and when the occasion arose a little later he made a small bet with Sgt Davidson the armourer who was noted for his ability on the ranges. After the last relay had done their worst, the two duly selected their weapons, loaded and began to fire. The first signal to the sergeant major was an outer, top left. Taking careful aim he corrected and fired again. This time bottom right and again the marker waved from side to side. Next an inner, a miss and a bull. It seemed that the harder the SM tried, the worse he became.

"The train backed slowly into the siding....."

Finally when Sgt Davidson also got a score that only a blind man could have been proud of they smelt a rat and Sgt Fielding in the butts was threatened with a couple of weeks fire picquet. Thanks for the entertainment Mr B!

A couple of days later the PPCLI put on a demonstration of personal camouflage and field-craft tactics. The RCEME group were parked on a hill and strained their eyes searching in the middle distance for an 'enemy' section whom they were told had taken up fire positions. Then the platoon commander blew his whistle, and all were amazed when the whole section stood up not more than 100 yards away. Finally to cap the whole thing a Bren, which had remained quiet for the whole show up to this point, opened up from a distance of about four feet in front of the audience. We were dumbfounded and one of the boys from Calgary said,

"Well hell, I been spittin' on him for the last half hour!"

That little exhibition of the Pat's must have impressed the class no end, because when the demand came for a dozen men to represent the enemy in an attack on the rest of the class everyone wanted to go. This was to be a real battle, with plenty of fireworks and noise, and to guarantee its success, Sgts Thomas and Fielding were given their squad to train for the rest of the day. The rest of the course set up shop and did a bit of training in the well hidden site in a clump of trees. Late in the afternoon, as might have been expected, it began to rain, but nobody seemed to mind since they were all issued with a number of blank rounds, some thunderflashes and a few smoke grenades, and they were determined to use them. They were also warned that they might expect patrols from any direction as the enemy were active and we were rather close to the FDLs. S/Sgt Hawes, the tels mech, was put in charge of the defence of the camp and for the purpose had scrounged a large number of empty tin cans and a lot of string. This was to booby trap the place, but I suppose the rain won precedence and the plan was dropped. However, guards and picquets were posted and we settled

down to complete the jobs that were on hand in the shop and to wait for the attack.

Shortly after supper there was a hue and cry on the south east side of camp and the chase was on. From the reports gathered later it was decided that the defenders had spotted a recce patrol of the enemy. The patrol took off as soon as the camp had been located but that did not deter the gallant little band of defenders. Leaving the workshop to its fate they hunted over a good part of the Wainwright training area firing at random, and in fact at anything else that moved, like the hunters in 'Peter and the Wolf'. For the next two hours the battle raged while the A&T Staff sat in one of the trucks and laughed themselves sick. The boys were determined to have themselves a fight, and no lack of enemy was going to prevent it. Finally for no apparent reason somebody lit the smoke generator and the scene became even more obscure.

As the shooting began to die out, mainly for lack of ammo, and as it began to get dark cries of, "Let's pack this up and go back to camp," were heard. Just then, with wild screams half a dozen soaking enemy soldiers came charging down the hill behind the camp, shooting as they came, and taking everyone totally by surprise. In spite of this Banzai charge however, they were soon all killed or taken prisoner by the defenders—that is, those of them who had not already been shot up by others of their own party.

Then, to complete the story, a few minutes later the whole place was lit up brightly by parachute flares. After a half dozen or so of these, when the remaining defenders had all dispersed looking for the parachutes and expended casings, the final attack came in, the scheme was declared at an end, and we all went back for eats and dry clothes.

* * *

It was the day after this that Mr Burke again made his place in the sun. In the morning he had been pointedly told by the camp sergeant major that the RCEME billets were NOT CLEAN! Since there were only a few offenders, and since this subject could be expected to offend the finer sensibilities of any sergeant major in his right mind (assuming that such a state is possible) one can readily imagine the flowery terms used to inform the guilty parties of their misdeeds.

Thus, this unpleasant duty completed and once again out on the range with the rest of the Wing, we again see the SM happy and carefree. By this time, RCEME had fallen heir to a surplus Norton bike from the Provost, and in no time flat Mr Burke found that he had irrevocably committed himself to ride it—and this before the assembled multitude. He duly mounted and with the long stretch of road before him managed to get the beast into high. Then, returning along the trail, he came over a little rise only to find in front of him a large and very wet puddle.

"Whoa there, you so-and-so critter!" he hollered in a panic and grabbed for the clutch in hopes of doing something to prevent the fate

"tank park at the other end of the parade square."

that he could see ahead. However, he grabbed with the wrong hand and as the front brake took hold, he suddenly found himself airborne. To the tune of a great guffaw from all he plunged into the puddle, making a splash that landed almost at the feet of the very ones whom he had dressed down that morning. (Here endeth the lesson.)

The rest of the camp period was a series of setting up shops in the field, doing jobs, and tearing them down again. It was at this stage that it really became apparent what a wonderful training area this camp of 160,000 acres is. There was practically nowhere that we couldn't go. And there were those who were determined to prove it. On all those occasions when they didn't quite succeed, for instance when the Sherman nosed over into the ditch, and when the APC bogged down, the crews of Sgts Fielding and Hetherington proved more than equal to their job. The practical recovery experience was appreciated by all.

The concentration, otherwise known as Exercise Buffalo, also had its share of stories and incidents, such as the time that Lieut Perry from Edmonton went out to do a recovery job. Finding that the crock was off the corner of the map, he nonetheless sailed off into enemy territory, was shot up badly and undeservedly got a good night's sleep. That was too bad, he said, because it turned out to be the first real crock that he had seen in several calls for the recovery section. All other times either the casualty could not be located or somebody else had got it out first.

Operation Banjo as the RCEMEs called it, was another little sidelight designed to alleviate the acute shortage of cookers that worked. "It" was first introduced by Capt McClure from Vancouver, who was at that time acting as OC Workshop and was, he claimed, the type of cooker as well as he could remember that was used in the desert fighting by the Eighth Army. "It" consisted of piece of copper pipe about eight feet long in the prototype, with a few small-diameter holes bored in the end which had been bent back like the end of a walking-stick. The opening in the pipe was then plugged and gasoline dripped into the other end from a reservoir. Rumour had it that it was supposed to work like a gas burner. In fact, however, it gave only a very smoky flame and that only in gusts that threatened to singe the beards from the whole multitude assembled to view the spectacle.

Mark II was made of gas pipe, and worked little better; but Mark II*, in which the pipe was extended about four feet more and connected directly to the fuel reservoir gave a blast like a furnace and heated the piece of boiler plate with which it was covered to a dull red glow.

The final word should be said about Cfn Cooke from Vancouver. All through the exercise he turned out meals so tasty that the people who had been up to Bde HQ on detachment were glad to get back to "where the eatin' was good!" Cooke-the-cook's performance was sterling. He never turned out a poor concoction. But he will be remembered as much for his mad dash in the Honey tank that had just been repaired in the shop. Finding a spare moment he arrived at the AFV section just in time to be invited on the road test of the thing. The mechanic on the way back turned it over to him to drive, and when all those in the area saw the white hat sticking up out of the driver's seat, they scattered like a flock of scared chickens. However, gunning the tank, Cooke swung it round to park it perfectly. Great boy, Cookie.

/The author who is a first-class photographer took pictures of many RCEME activities, but unfortunately his camera, containing all the pictures he had taken, was stolen on the last day of camp. ANYONE HAVING ANY INFORMATION THAT MIGHT LEAD TO ITS RECOVERY PLEASE GET IN TOUCH WITH CAPT HEATH, c/o HQ RCEME Western Command, Kingsway Ave, Edmonton, Alta. —Editors/

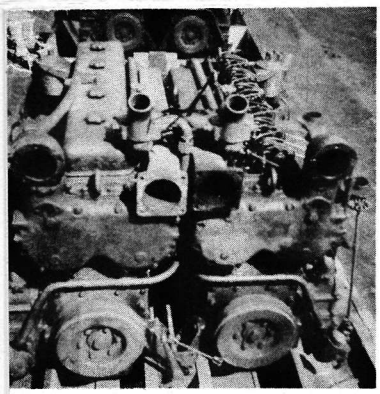
(continued from Page 18)

of each individual. If the required information and experience was not available in one particular team other sources were tapped and quite often a minor conference took place to iron out some tricky point. With this mass of information coming from all quarters like the tentacles of an octopus, a scale was born.

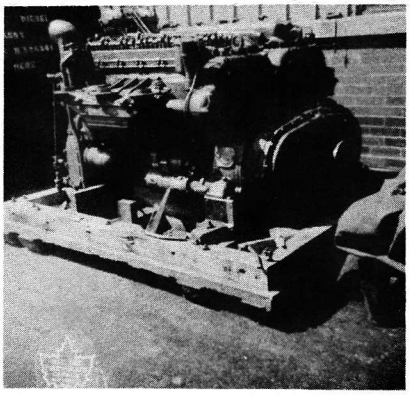
By the 28 Sep, a task which almost appeared insurmountable one short month before had apparently been completed and all personnel employed on this phase of the operation were returned to their units. Unfortunately, daily amendments to establishments and war equipment tables necessitated further scales and certain personnel had to be recalled. All told, approximately 210 different types of scales were produced—a fact which gives some indication of the vastness of the task.

Many lessons were learned from this exercise, but that, again, is another story.

Student: "But, officer, I'm a college student."
Officer: "You'll go to jail just the same..... Ignorance is no excuse."



Fan drives and studs missing.



Broken valve assembly.

IT COULD HAP

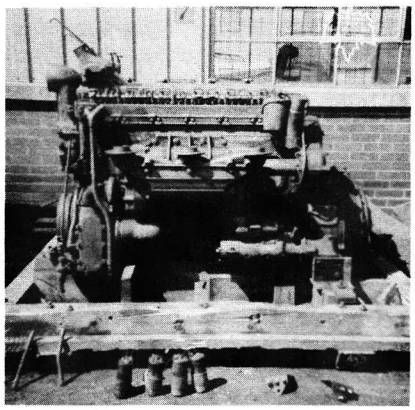
or

'did you

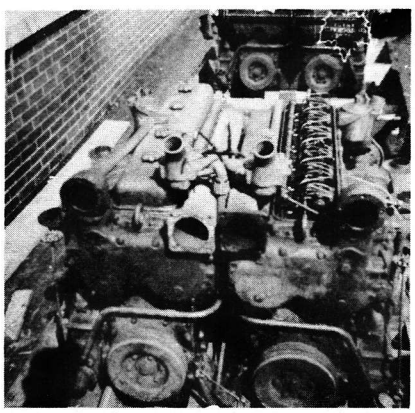
by MAJOR J. W. WHITTINGHAM RCEME

Old Major Doe sat down at his desk one morning and found a letter from a Cfn Jackson in his mail.

The Major could vaguely remember a lad named Jackson who had been sent to the workshop in Camp Borden some time ago. He wondered what had been in the back of Jackson's mind when he wrote the letter.

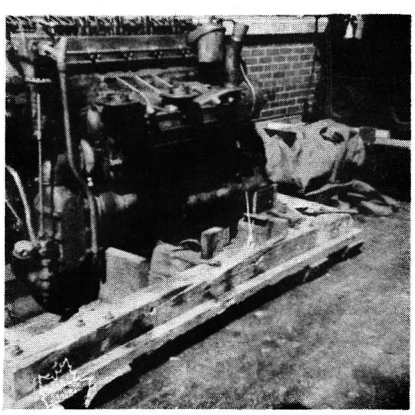


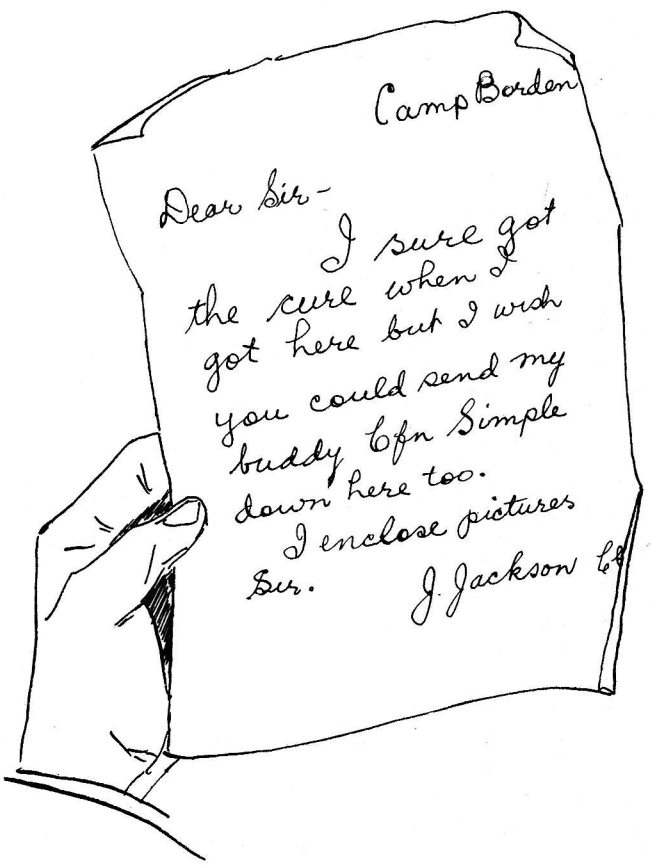
Loose mounts and broken crate.



Dirty parts.

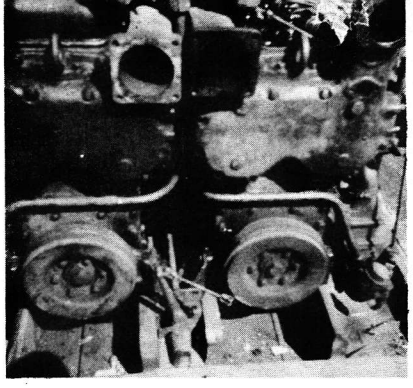
Disgusting, isn't it?




Camp Borden
Dear Sir-
I sure got the curse when I got here but I wish you could send my buddy Cfn Simple down here too.
I enclose pictures
Sir.
J. Jackson Cfn

PEN TO YOU

ship this engine?



Throttle rods in bottom of crate.

Accessories loose in crate.

This is what had been in Cfn Jackson's mind when he decided to write a letter to his former OC:—

It was Friday the 13th and I should have known better, but who thinks of dates except with blondes. My buddy and I wanted to get away on a weekend—he'd lined up a couple; but I'd been instructed by a very polite Sgt to prepare a certain engine for shipment before I could have my pass. Normally this business of preparing and crating engines for shipment is a most complicated process and takes a hell of a lot of time, and time with my rank means hard work. Shall we say, I rushed a little in order to get my pass?

Well time went by, weeks I think, I'd even forgotten who my date had been, but one morning I was called into the main office to be paraded to the adjutant by the RSM. I was asked a couple of simple questions and the next thing I know I am in front of the Old Man's office with an escort. The RSM bellows PRISONER AND ESCORT 'ATTEN-SHUN' Right turn—quick march—right wheel and so on until I find myself in front of the Old Man himself.

"HALT RIGHT TURN"—Cfn Jackson Sir! Then comes some hollering from the Adjutant and I finally gather that I have either done something or I forgot to do something, I'm not quite sure which.

"This is pretty serious Jackson," says the OC, "what have you to say?"

"Nothing Sir".

"What do you mean nothing!" he bellows. "I have here evidence that you did do this thing and not only have you got me mad but the DME and everybody else both ways is tearing his hair and all you say is NOTHING Sir".

"Well it's not exactly nothing Sir I———"

"I'll say it's not" comes the old man and I can see he is hopping mad.

"You not only ruined an engine crate when you boxed that darned engine but you didn't wash off the oil and dirt; the engine is far from complete, no tags, no logbooks, no nothing, only everybody hopping on me from TOPSIDE. Good ———Splutter, splutter". Suddenly the spluttering turned to coughing and after the coughing dead silence for two minutes.

I am remembering now not only the blonde's name and how much dough she cost me but probably how much the whole thing is going to cost me if the Old Man gets tough.

This train of thought is interrupted by the OC saying, "Jackson, have you ever thought what it would be like to be on the receiving end of these NS engines, because if you haven't you better had, I am going to arrange for you to be posted to Borden. That's all, Sergeant-Major".

"LEFT TURN, QUICK MARCH———"

****

When I arrived at my new posting I was pleasantly surprised to find a very nice workshop and a good bunch of guys to work with, and before long I was one of the boys. My old workshop was forgotten.

Well the captain called us all together one day, a couple of weeks back, and told us there was a bit of a flap on to get out a bunch of GMC Twin Diesels in a hurry. He gave it to us straight and said if necessary we'd have to work extra hours but if all went well, we would be able to do the required number within the time allotted. Well suffice to say, for the next few days all went well, and with a long weekend in the not too distant future I was looking forward to blondes, and things and stuff. Now don't get me wrong, I had learned my lesson, and although I was rushing I was skipping absolutely nothing.

Suddenly it happened. The last six engines of our program arrived. We jumped on them like a bunch of hungry wolves ready for the kill and guess what—we had to BREAK OPEN the crates and when we did, OH BOY!——it all came back to me: my old shop, my buddy, my hurry to get away on the weekend, my blonde, everything. Then I remembered MY BUDDY WAS STILL THERE. Oh me, no long weekend now for sure. If I ever get my hands on the guy that crated THIS engine I'll——I've got it——I'll write a letter to my old OC. Yes, that's it—the one on the page opposite.

RESERVE FORCE

6th Tech Rgt

Remembrance Day ceremonies for the 6th Tech Regt (formerly 32nd Tech Sqn) at Windsor were threefold this year. The custom of holding a unit ceremony on the parade night closest to 11 Nov which was started some five years ago was carried out as usual. The unit is drawn up in review order, just previous to dismissal, and a short service is held and a wreath placed on the cenotaph. Last Post is sounded by the buglers, a Lament is played and a one-minute silence observed before reveille. Relatives and friends of members of the unit are invited to attend and every year the civilian attendance has increased.

The cenotaph used by the unit was constructed in 1946 and is movable and can easily be set up each year. It is five feet six inches in height, made of plaster board covered with stucco and lettered in black. The base is four feet by three feet and a separate stand can be used to raise the cenotaph higher when required. As it is usually set up in the drill hall the extra base is not needed.

On the Saturday closest to Remembrance Day the Sergeants' mess hold an annual dance. Here again the cenotaph is used for a brief ceremony at the hour of eleven at night, and respects paid to departed comrades. This year's ceremony was on Nov 11 and was attended by a number of notable guests, including Mr. Harold Beardmore, the collector of customs for the Port of Windsor, ex-commanding officers of the RCEME and RCASC. The ceremony was arranged by WOI T. E. E. Slater, and was most impressive.

The third phase of Remembrance Day observance was a parade at Essex, on Sunday 12 Nov when about sixty members of the unit under command of Major Don C. Little, OC moved off in convoy to assist the Canadian Legion branch in their ceremony. In addition to the representation from the regiment there was a specially picked squad of forty from the High School Cadets, who are attached to the regiment for assistance in training. This with the South Essex Associated Brass Band under direction of Mr. E. L. Robertson, a good turnout of Legion members and the Ladies Auxilliary, made the parade, one of the biggest in this area. The unit was complimented on its precision and marching by many of the old timers who were surprised that

Corporals A.E. and G.W. Richardson, sentries at the Cenotaph.

a technical unit was able to reach the degree of efficiency shown in ceremonial drill and at the same time show their ability with heavy motor vehicles. Twenty-odd vehicles were taken in the convoy and an opportunity given to the public and especially the cadets to inspect and operate some of them. Several ex-servicemen and NCOs inquired about service with the unit and a number of recruits were interviewed.

* * *

Always on the lookout for a chance to be of service to the community, the Public Relations and Publicity Section, of 6th Technical Regiment worked out a fine hookup with the City of Windsor, and the Goodfellows' Club.

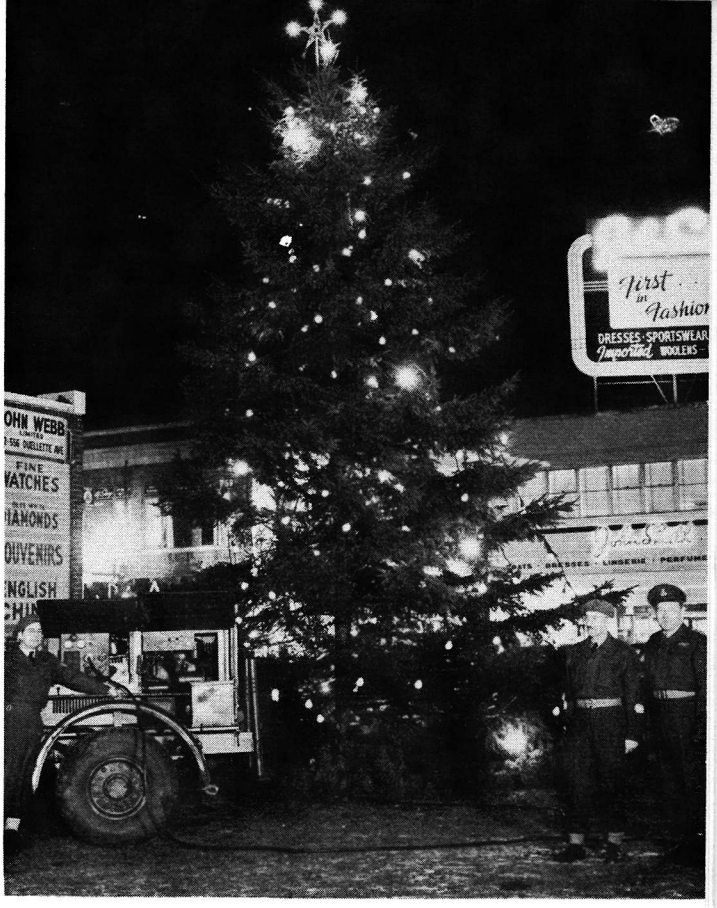
In October it seemed that a very definite shortage of hydro power was certain for this district for the month of December, with curtailment of street, store window and sign lighting. WOII E. J. Smith, of the Recovery Squadron, came up with this brilliant idea: a community Christmas tree on the main street; power for lighting supplied by our generator trail-

er; and Christmas carols over the telecom section loud speakers with Santa Claus on hand each night to interview small fry of all ages.

Captain H.G. Oster, Stores Officer, and WOII Fred Turner, headed the committee to make the necessary arrangements. With the co-operation of the Parks Department and the Hydro (for bulbs) a 35 foot tree was erected. The unit decorated it with silver tinsel, and each night from the 14th to the 23rd a voluntary detail from the regiment brought the generator from the barracks to light up over a hundred coloured lights on the tree (gas was supplied at no cost to the taxpayer). They played the old and new Christmas carols till 11 PM. Santa Claus, in the person of WOII Mark Cullington was on hand each night and the Goodfellows' fund collection box on his table resulted in over $100 being donated.

Many passersby stopped to get better acquainted with the unit and some recruits were obtained. Many civic organizations have complimented Major Don C. Little OC 6th Technical Regiment on a good community effort.

by WOII MARK CULLINGTON, RCEME, RF



Left to right: S/Sgt K.E. Hines, WOII F. Turner and Capt H.B. Oster.

20th Tech Sqn

A very successful training exercise was held at Aldershot Military Camp during the weekend Oct 28, 1950, by 20th Tech Sqn, under the command of Major O.B. Berringer.

A small advance party under Lieut Harold Bowes preceded the main body and had all in readiness at the camp when the unit arrived. One of the highlights of the operation was the quality and quantity of the meals served and much of the credit goes to Lt Col Fry, OC 5 Div Column RCASC, who also had his unit out for weekend training. Major Berringer returned the compliment by providing four armourers to assist the Service Corps on the sten gun and rifle range.

Some colorful advertising was done for the scheme, one night by RCEME and the following night by RCASC; RCASC said RCEME were coming along to fix their rifles and RCEME said RCASC were being taken along to cook their meals.

The main party consisting of six officers and thirty-five 'smartly turned out' other ranks mounted in eight vehicles moved from Willow Park at 1400 hours on Saturday. For road control Capt Greer Marks, OC convoy, was provided with wireless, which helped greatly in keeping the convoy together in the heavy weekend traffic.

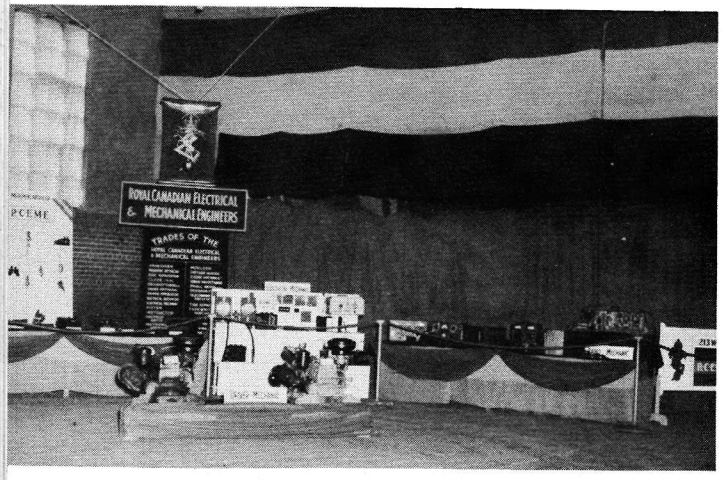
On arrival at camp little time was lost in finding the cookhouse where pork chops were the order of the day. The evening was spent in recreation, consisting of a movie, refreshments, and dancing in Kentville.

Early the next morning the vehicles were moved into the workshop site where instruction was given in setting up and operating the M, KL and ZL machinery lorries; cross country vehicle operation, and recovery. No operation of this kind is complete without its humorous and sometimes aggravating situations and this one was no exception. For instance, ZL training was handicapped when the generator gas tanks were found to be empty and someone had forgotten to bring along the welding kits.

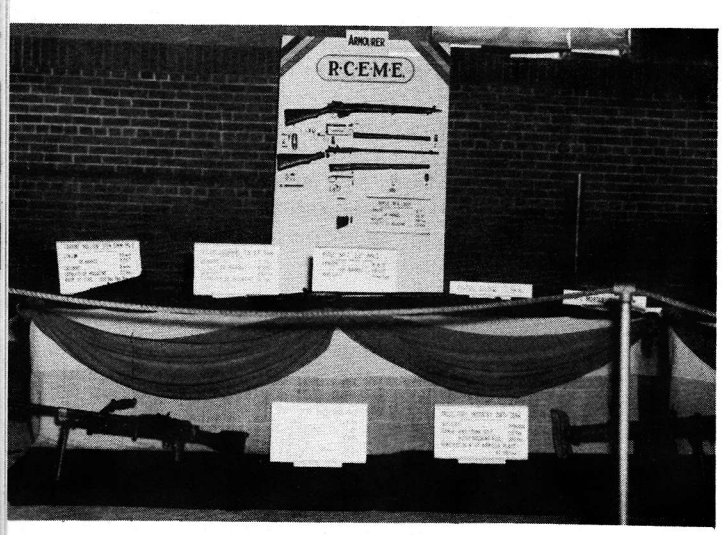
The method of recovery was particularly interesting. The drill here again employed a '19' set at HQ (ZL lorry) and a '58' set on the breakdown and another at the casualty location. The gremlins again put in an appearance and Lieut Bill Kelly and Cpl Tufts ran into difficulties trying to extend the range of the '58' set beyond eight feet—repeat feet, not miles. Two exercises were completed where the casualty called HQ giving a map reference, and HQ in turn passed on the information to the wrecker

crew, patrolling the area. (It is interesting to note that RT talk and map reading have been given priority in the winter training program.) One recovery job at first resisted all efforts but finally by everyone lending a hand—or rather a shoulder—the casualty was back on the road.

The day passed all too quickly and early Sunday afternoon the unit moved out on the return journey to Halifax, arriving home at 1600 hours. Many valuable lessons were learned which after all is the reason for such training exercises. Next time the welding kits will definitely be along and the gas tanks will all be properly filled.



RCEME exhibits at Ft Osborne Barracks.



Army Week Winnipeg

In Winnipeg, Army Week was opened with a Garrison Church Parade which was held out of doors in Assiniboine Park. The Church Parade was very well attended and the weather was perfect. Personnel of 213 Workshop and HQ RCEME participated and all concerned were well turned out and their appearance and marching was a credit to the Corps.

On the following days, Monday, 18 Sep, and Tuesday, 19 Sep, a luncheon was held in Fort Osborne Officers' Mess, to which were invited Hon D.L. Campbell, MLA, Premier of Manitoba; Mayor G. Coulter, City of Winnipeg; Hon C.E. Greenlay, Minister of Labour; prominent members of the clergy; municipal and provincial governments; representatives of Service Clubs; and Reserve Force Commanders. These luncheons were a great success and much time and effort were expended in arranging for greeters and certain senior officers to act as the conducting staff for the preview of Army exhibits following the luncheon.

On the evening of Monday, 18 Sep, Fort Osborne Barracks held open house for the general public and it is estimated that about 2,000 persons attended. RCEME had to be particularly careful in preparing their exhibit as we had been forewarned that RCASC were being allocated adjoining space and that free hamburgers and coffee were being distributed. In spite of this severe handicap, however, a very good exhibit was prepared and we succeeded in getting the interest of the majority of the visitors. Incidentally, to the left of the RCEME exhibit a free movie was being shown.

The RCEME exhibit consisted of a display of small arms, instruments, telecommunication equipment, battery testing equipment and used and rebuilt motors. NCOs and tradesmen were selected to be on duty to explain the ramifications of repair and maintenance to the interested visitors. The fronts of the booths were appropriately decorated with blue, yellow and red bunting and the whole was surmounted by the new RCEME Corps Crest which was kindly loaned to us by 212 Workshop RCEME, Shilo.

Following open house at Fort Osborne Barracks a similar exhibit was set up in 7 Tech Regt RCEME quarters at Carpiquet Barracks and this again was a successful evening. During the whole of Army Week searchlights were in operation and, as usual, it was necessary for RCEME personnel to maintain and operate the lights.

OPERATIONAL RESEARCH

by MAJOR H. GOODFELLOW, MBE, RCEME

Let us look for a moment at the business world. We find that the great business magnate of the past had a 'claim to fame and fortune' which depended on his executive ability, his business sense, or to put it correctly, his ability to make a true qualitative analysis of his business problems. Industry today, however, is so complex, so complicated, the number of variables which affect any particular business so numerous, that the business magnate finds that his qualitative analysis, although always necessary, does not give him an accurate enough picture upon which he can base his future plans. He finds that, in addition to the qualitative analysis he is in the habit of performing himself, he also requires an accurate quantitative analysis of his business problem, as a whole. Hence today we find in the business world that the executives employ teams of scientists and statisticians to identify all the variables which affect their business, and to calculate for them the relative and quantitative effect that each individual variable has on their business as a whole. The special characteristic which differentiates these teams from other branches of applied science is that they take as the phenomenon to be studied the whole executive problem, and not the individual technical parts. Rather than provide the departmentalized branches with scientific data, they produce objective tests in order that the executive may have factual basis for the exercise for his judgment.

If we turn, on the other hand, to the military problem, we find that warfare is, by comparison, an even more complex activity. Although operations in warfare can be considered similar to the operations of a large industrial concern, the perimeters which limit the effect of any variable in warfare operations far exceed the perameters encountered in the business field. We have the military commanders and their staffs who, after many years of training and experience, have the acquired skill in qualitative analysis of weapons, tactics and strategy. However, since the staff is departmentalized and composed of specialists who study and are responsible for the component parts of any operation, it was found that the commanders, as in the parallel case of the industrial executives, had a need for teams of scientists and statisticians who could study and analyse the operational situation as a whole.

It was these teams of scientists and statisticians that became known as 'Operational Research Groups'. The original army sections were formed in England during the war to study tank gunnery, field artillery and infantry weapons, and a further six sections were provided to work in the overseas theaters of operations. The typical type of project studied by the groups in operational theaters was the location of enemy mortars, the distribution of hits and penetrations in allied and enemy tank casualties, the performance and best method of use of the PIAT, the problem of dust on roads and airstrips, and the examination of mud. It is true to say, just mentioning one case, that the report on the location of enemy mortars was the factual basis on which the counter-mortar organization was set up in 21 Army Group.

Army Operational Research is concerned with the study of warfare, which, for convenience, can be considered under three groupings: (a) the study of weapons; (b) the study of tactics; and (c) the study of strategy.

When studying weapons, the operational researcher analyzes how and why existing equipments perform as they do; how they can be improved, and probably more important, in view of the increasing complexity of military equipments, how the man-weapon combination can be improved. The man-weapon combination is a very important factor since it involves the manpower requirements to make the weapon, the training of personnel to use the weapon, and the supply of men to maintain and repair the weapon.

When studying tactics, the operational researcher analyzes the various tactical methods in use, with the same object of improving them. This study may result in revealing the characteristics of a new weapon required to meet a tactical situation, or it may result in revealing the changes or effects or a change in the tactics following the introduction of a new weapon.

When studying strategy, the operational researcher analyzes the results achieved by various types of operation, and the cost in the resources of war in achieving them, with the aim of suggesting more effective and efficient strategy. One must remember in this regard

that strategy must be directed not only towards winning the war, but ultimately winning and securing the peace.

The problems which confront the research worker in army operational research will fall into four main groups:-

(a) Theoretical
  (i) The prediction of the operational effect of existing equipments under stated circumstances, eg, when the lethality of a weapon is known for certain conditions, to calculate the lethality under other conditions.
  (ii) The predictions of the necessary characteristics of equipments under design, eg, to calculate the optimum relationship between mobility, armour and armament in the design of tanks.

(b) Experimental
  (i) The assessment of the operational effect of introducing new equipments, which may be for either training or for use in the field.
  (ii) The assessment of the operational effect of introducing new methods of using existing equipments.

(c) Statistical
  (i) The analysis of operational statistics, the study of any pheonomenon where chance variations play an important role, eg, the analysis of data recording the positions where tanks have been penetrated by enemy projectiles.
  (ii) The analysis of data regarding training, enlistees, injuries, or any other matter suitable for statistical analysis.

(d) Field Surveys
  (i) The recording of facts and data where the emphasis is on the collection of data rather than on the analysis.

The army operational researcher employs essentially the same method and techniques as do the workers in the other experimental sciences (physics, chemistry and biology) or in deductive mathematical science. From the operational research point of view, in experimental work, and for that matter in the mathematical and analytical work too, the method of approach is made complex by three factors which are always present: (a) the selection of the criterion of performance; (b) the great number of variable factors; and (c) the inability, or undesirability, of controlling the variable factors.

The selection of the criterion of performance is always the most difficult stage in the prosecution of any operational research problem. Its success depends largely on two factors:-

(a) the ability of the sponsor of the project, and of the interested user of the equipment concerned, to assist the researcher to state what the problem is in exact terms; and
(b) The ability of the researcher to realize all the important practical aspects of the particular project. It is in this regard that it is essential to have service officers, with a scientific outlook, included in the research groups.

No general rules can be stated as a guide in the selection of the criterion of performance. As in the case of the more usual types of scientific research, success depends on experience and the development of what amounts to an intuition; however, here is a typical example of what may happen:-

(a) The problem, as submitted by a Directorate, may be "To improve the efficiency of weapon X".
(b) An examination of the problem will reveal that under different circumstances, depending upon the nature of the weapon and its tactical use, 'efficiency' may be measured by one or more of the following conditions:-
  (i) Rate of fire
  (ii) Accuracy of the first round
  (iii) Time to fire the first round
  (iv) Consistency of a series of rounds
  (v) Effect of fire on the target
  (vi) Man-weapon combination
  (vii) Supply of ammunition and
  (viii) Mobility of weapon
(c) After careful consideration of all conditions with the design branch and the user, the problem may be re-worded, eg, "To improve the accuracy of the first round fired by weapon X", and all calculations will be conducted with this new object in view.

This example will suffice to illustrate the importance, and often the difficulty, that is experienced in selecting the criterion of performance. It also serves to illustrate the role played by operational research, since, although the design branch will know the answer to many of the above mentioned factors, it can only be an outside body which can weigh and decide which factor will be the controlling variable. In many cases, it may be necessary to conduct preliminary trials to discover just what it is that the interested parties want to know.

Once the fundamental aim of the project has been selected, it becomes necessary to list all the factors which affect, or may affect, the chosen criterion. This is not difficult, particularly if the researcher is acquainted with the equipment or operation concerned, and also if he receives adequate assistance from

the users and the planners. It follows that workers in this field must be closely in touch with, if not actually part of, the executive department.

The general principle is to arrange for the collection of data relating to any factor which varies during the operation or trial, or which did vary during the period when the data was collected. (This is important if the project involves the study of past battle operations.) An important fact that must be remembered is that the data collected must be in a form which can be treated mathematically, or statistically.

It is not possible, in this article, to go into the various methods of analysis which must be employed in operational research. The presence of several variables affecting the criterion is not, in general, a difficulty if the trial or the collection of data has been adequately planned, since the statistical techniques for dealing with them, such as the analysis of variance, have been worked out fairly fully in other spheres, particularly in the biological sciences. An appreciable knowledge of these techniques is, however, usually necessary to ensure the proper application of the appropriate technique to a particular problem — nothing is so dangerous and confusing as the automatic application of a method of analysis which has been worked out for some other problem, by someone who does not understand the basic implications and limitations of the method. From their very nature statistical methods, like other mathematical devices, cannot reveal anything that is not already implicit in the data, therefore, reliability of the data is of prime importance.

Notwithstanding all other important facts, the greatest responsibility resting on the operational research worker is that he, himself, shall translate the statistical results of his findings into terms immediately relevant to the problem that has been investigated, so that they are explicit to the user of the report.

Army operational research came into being during the Second World War, with the object of applying scientific methods of experimentation, analysis, and deduction to the whole conduct of military operations, and to the preparation for such conduct. It is concerned with the performance of equipment in the hands of the user and with the improvement in this performance. An additional purpose is to assist the staff planning of operations by making available objective information on which the staff can estimate their requirements and predict the result of any decided course of action.

In conclusion it may be said that operational research is similar to other forms of scientific investigation, in that its object is to determine the inter-relationship between factors which have a bearing on a given military problem. And by virtue of this acquired knowledge to provide a solution, or alternative solutions, to the problem. Operational research differs from pure or applied research in that it is concerned with providing factual data and objective tests on which an executive may base his decisions.

AN ARTIST CRAFTSMAN

To model a horse and rider at all is no mean artistic feat. But to do so from virgin metal is technically as difficult a job as anyone can tackle.

Our photograph shows a small statue of a Western ranch horse and his owner, as sculptured by one of our own civilian craftsman. Mr. Crookshank is one of the stalwarts of the motor vehicle shop at 215 Workshop RCEME, Calgary. Needless to say Mr. Crookshank is a highly skilled metal worker, and in his spare time he has devised and fabricated a number of artistic ornaments and emblems for various associations and persons.

The figures in the photograph are not cast from a plaster mold. They are wrought directly from steel plate and steel bar with tools normally available in a blacksmith's workshop. Those of you who have tried any amateur blacksmithing can appreciate to what extent this craft can be transmuted into an art.

the CENTURION AFV of the RAC

by CAPT F.J. SERGI, THE RCEME SCHOOL

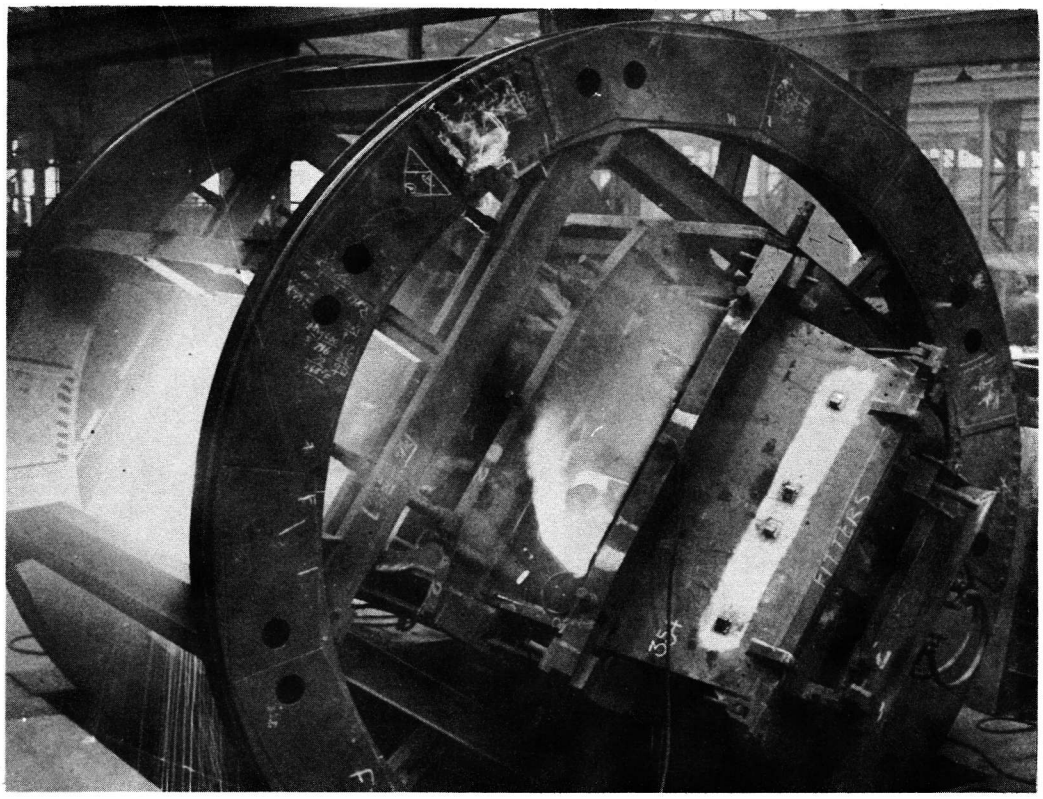
The purpose of this brief article is to acquaint RCEME personnel with the modern trend of British armour as typified by the Centurion tank.

Towards the end of World War II British armour design had made very marked advances. A new tank, the Centurion, was put in the field but the war ended before it could undergo its baptism of fire. As a result this tank, although performing excellently under peacetime conditions, had yet to be proved in combat. The Fighting Vehicle Design Establishment (FVDE) in conjunction with Vickers-Armstrong were responsible for its design and for the manufacture of the prototype and several test models.

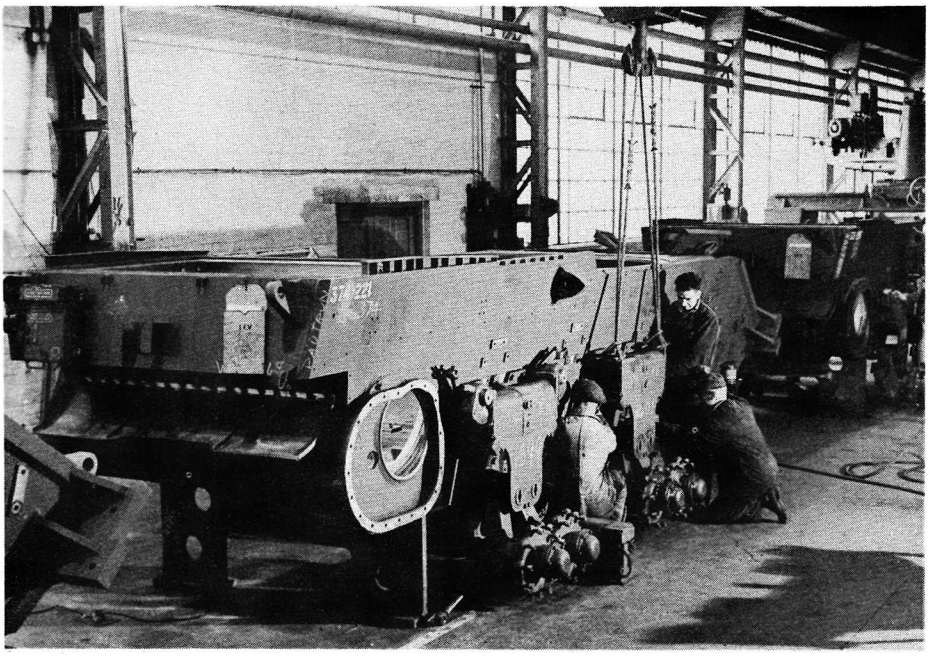
The tracks are of the dry pin center guide type. The shoes are of cast manganese steel and are designed to give optimum traction on varying types of ground. They are twenty-four inches in width giving a ground pressure of 12.6 psi.

There are three suspension units on either side. Each unit contains a horizontal spring assembly comprising three helical springs arranged concentrically and guided by a central rod and tube. The two outer springs are of equal length but of different rate. The inner spring is shorter and is effective only when initial movement of the road wheel has occurred. The spring assembly is carried between knife edges on the axle arms, which are hollow and form a reservoir of oil for the joint bearings. Above the spring assembly of the units fitted to the front and rear portions of the vehicle, are carried two shock absorbers, independently pivoted at the center of the bracket, each being completely submerged in hydraulic fluid and connected to the appropriate axle arm by a bell crank lever and link. The suspension unit fitted to the central position on each side has no shock absorber. Six twin rubber-covered bogie wheels on each side transmit movement of the tracks to the suspension unit.

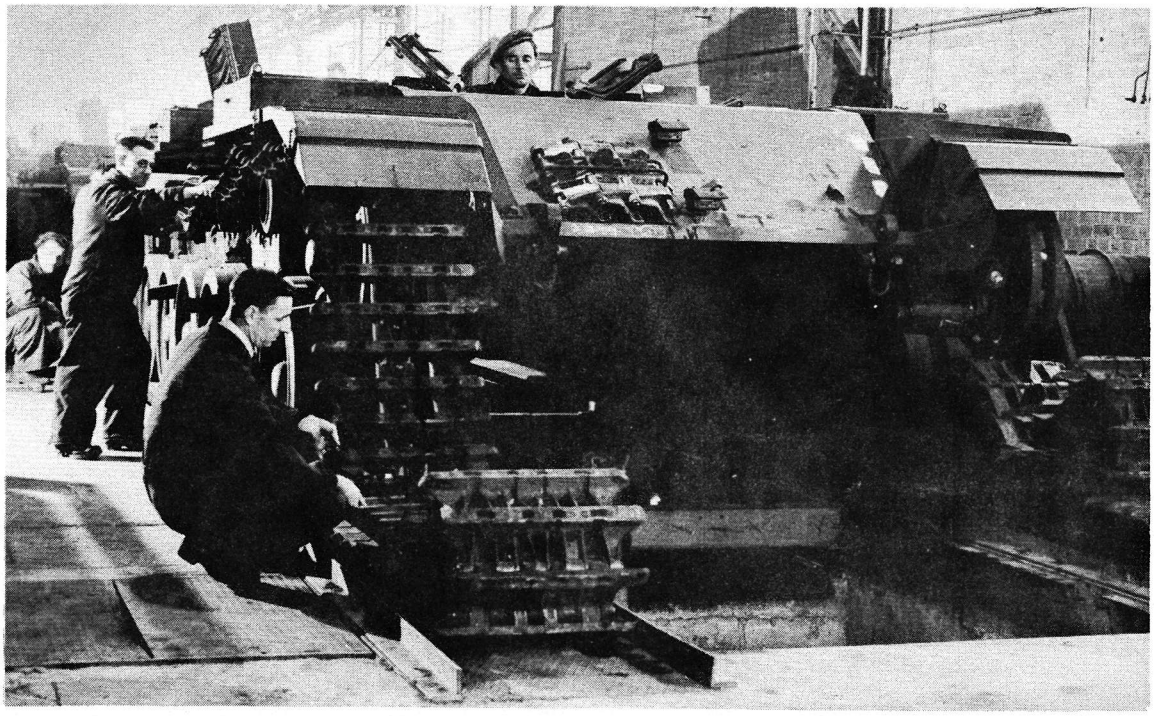
The Centurion is powered by a 12-cylinder



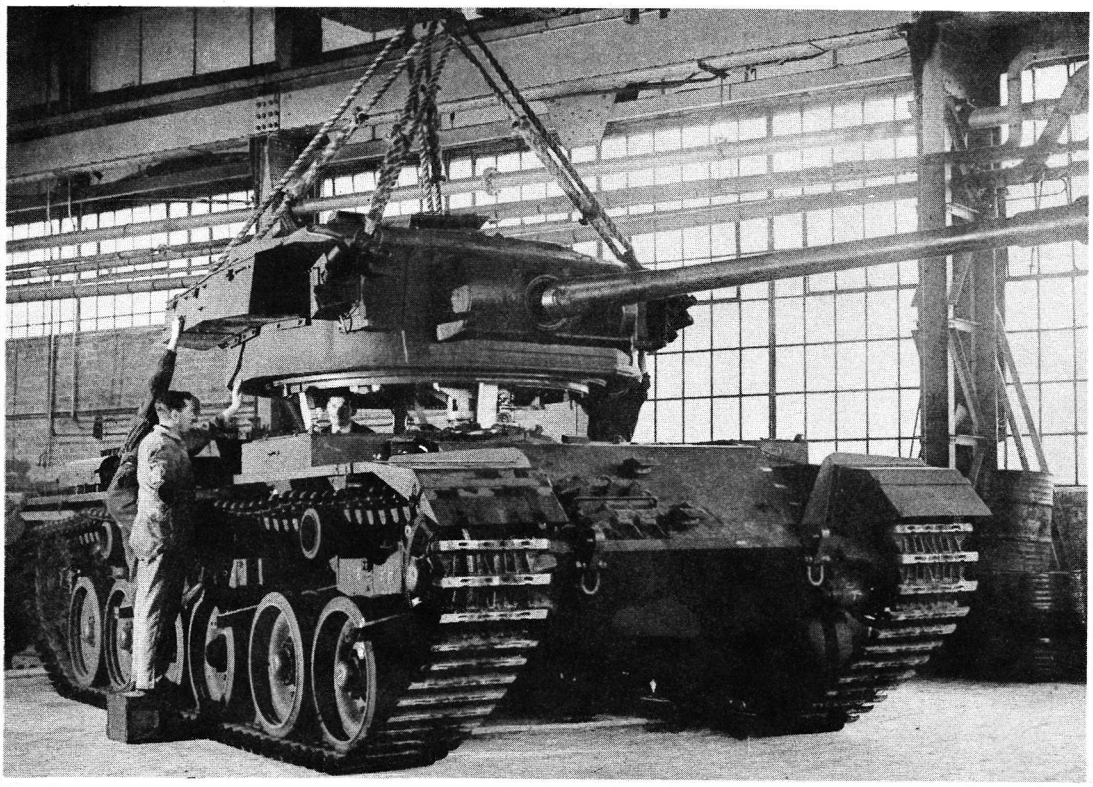
Tank hull being welded in the manipulator.



Suspension units being fitted to a hull.



Fitting the tracks over the driving sprockets and the suspension wheels.



The tank begins to take shape; the turret complete with gun is mounted on the hull

635 bhp Meteor engine, having a V 60° block and producing a maximum torque of 1535 lbs ft at 1575 rpm. This is an adaptation of the famous Rolls Royce Merlin aero engine. Fuel consumption is good as is the speed obtainable on a hard surfaced road.

The transmission is the well-known and proved Merritt-Brown type. A very desirable feature is the high speed reverse as well as the conventional low speed. A skid reverse turn (reverse steering) is obtained in low reverse and a power turn (reverse steering also) in high reverse. To obtain high reverse an idler gear was interposed between the main shaft and layshaft. Low reverse is obtained in the usual manner, ie, by locking the layshaft to the gear box housing.

The steering mechanism is incorporated in the gear box and is of the controlled differential type. Use is made of epicyclic gearing in conjunction with a differential gear. By applying either of the two steering brakes, the output shafts of the differential are controlled, thus causing the speed of one track to be increased and the other reduced. By locking one of the steering brake drums a definite ratio difference between the two output shafts results, giving a geared turn. In this manner, power loss is avoided. A different turning radius is thus obtained in each gear.

The final drive is of simple gear pattern and gives a reduction of 7.47 to 1.

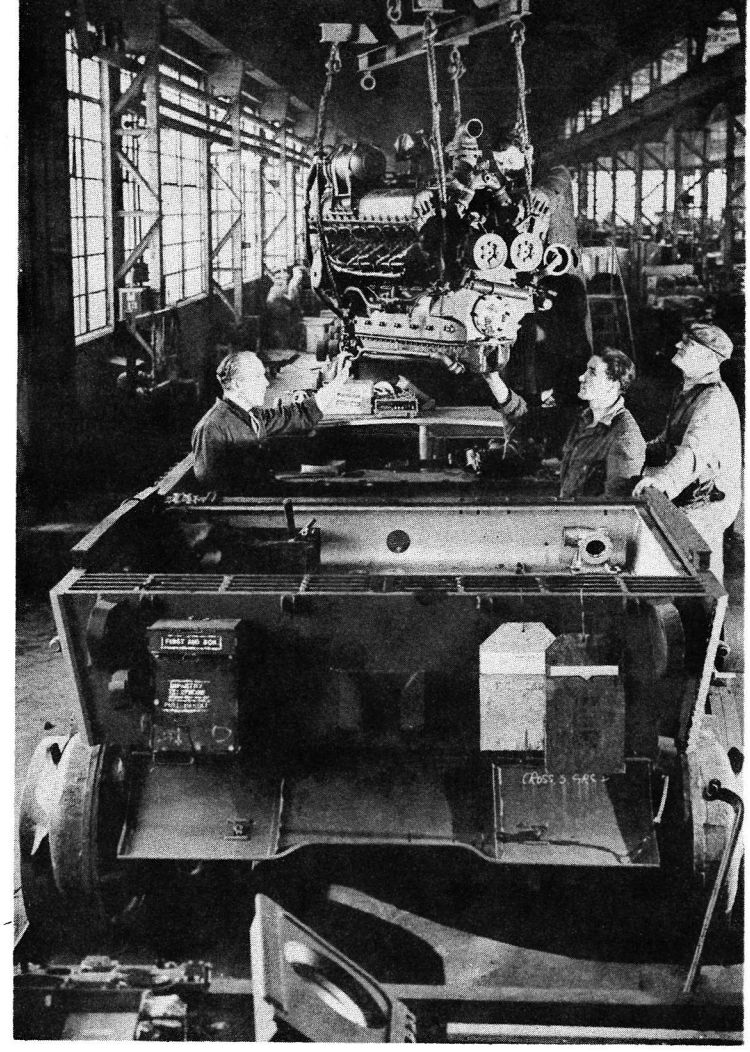
The traverse mechanism is all electric with arrangement for manual operation in case of loss of power. Electrical power is supplied by an 8 hp (British rating) Morris spark ignition engine and a 3 kw generator.

While attending the Military College of Science I had the opportunity of visiting various establishments where the Centurion was undergoing trials. I remember one such visit where a demonstration of the tank firing on the move was given for the benefit of the Vehicle Group students. A round was fired while the tank was stationary, and successive shots were then fired with it on the move, following a circuitous route over rough terrain.

During my attachment to the Fighting Vehicles Proving Establishment I had the opportunity of testing the various AFVs used in the British army and my choice was the Centurion. Its manoeuvrability was very good considering the fact that the driving controls are purely mechanical. I found the reason for doing away with hydraulic and air assisted controls was to minimize the number of parts that require servicing.

Finally in Germany I was able to get in touch with the actual users. Through contacts with the technical adjutants of the various armoured regiments I gathered that: (1) most of the armoured regiments would gradually be equipped with the Centurion; (2) there were still a few minor design details which had to be altered; (3) the actual all-out test of the tank would take place during the fall manoeuvres and (4) very few people understood the operation of the stabilizer.

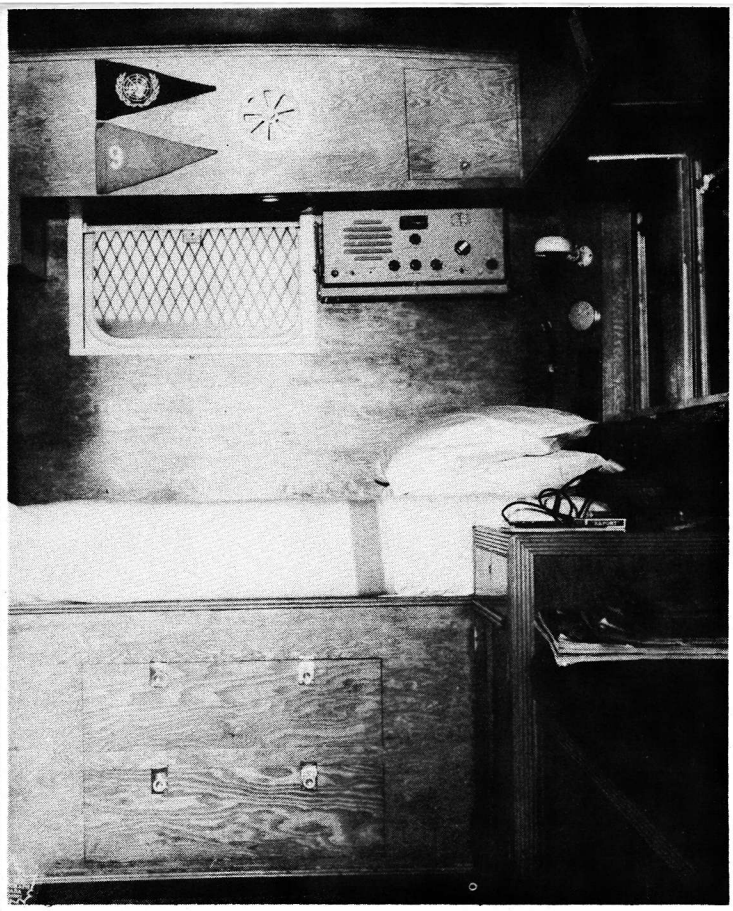
The Centurion continues to be the interim AFV of the RAC.



Installing the 12 cylinder 635 bhp Meteor engine at a Royal Ordnance factory in England.

(Photos courtesy of Central Press Photos Ltd, London, England)

[The information contained in this article must not be republished in any form without first getting the authority of the RCEME Quarterly—Eds.]



"THE CARAVAN"

Producer:	A.G.M. Maitland
Directed by:	H. Bolster
Music by:	L. Miggins
Sets by:	M. Vaupel and F. New
Costumes by:	W. Miller and York
Make up by:	Graham and Coats
Lighting by:	Kerr
Special effects by:	CCC and 17 ROD
Sound by:	Mathews
Technical advisor:	A.H. Lewis
Produced by:	214 Base Workshop

Interior and exterior views of Brig J.M. Rockingham's caravan—Photos by DPR(Army)

Another view of the Centurion tank in service. The skirting plates protect the suspension from anti-tank grenades. Note how firmly the track grips the ground.

CORPS ASSOCIATION

The RCEME Corps Association held their Fifth Annual Meeting at the RCEME School, Barriefield, on the 21 Oct 1950, and eighty members attended. They came from Halifax, Quebec, Montreal, Ottawa, Kingston, Toronto, Niagara, Winnipeg, Vancouver and Victoria.

Brig G. M. Grant, the President, reported on his visit to Western Canada (see Oct Quarterly).

The secretary's report revealed 'another successful year'. The membership had increased from 283 in 1949-50 to 381, with ten groups in operation. Paid up members by groups are as follows: Vancouver Island 18; Vancouver 40; Edmonton 14; Winnipeg 23; Halifax 10; Montreal 75; Ottawa 32; Niagara 26; Kingston 20; and Toronto 123.

The Publicity Committee report by Major Ackhurst showed that although requests for news of activities had been sent to all Chapters and Groups little of interest had been forwarded for publication in the Quarterly. Considerable discussion took place on the distribution of the Quarterly. While it could be considered the official organ of the Association, it was classified as 'restricted' and could not therefore be distributed to all members of the Association. It was recommended that the executive take the necessary steps to have the Quarterly distributed to all paid up members of the Association and that part of the expense of printing and mailing be met by the Association.

It was decided that a publicity representative should be appointed in each group to constitute a publicity committee on the national level.

It was recommended that Reserve Force training be encouraged by offering a pennant for attendance and interest, although there was some disagreement as to the plan's practicability.

Reports of the Chapters were given by representatives present, and some of the highlights were:

In Halifax, to foster the spirit of the Association among new members, RCEME COTC were invited to attend its meetings.

The Montreal Group sponsored a RCEME all-ranks' reunion on 15 April. A novel sort of

(Continued on Page 46)

A SOLDIER'S LAMENT

by Pte R. H. Bince RCEME

Why do people glower and sneer
Whene'er I come to town?
The girls all turn away in fear
And on my presence frown.

Before I donned this uniform,
Or fell in with the men,
I never failed to find a date,
The girls all liked me then.

But now they turn away in hate
Whene'er I come their way.
The answer always is the same,
"I can't come out today".

"I'd love to, Ron, really I would,
But mom would have a fit,
Now if you wore civilian clothes,
She wouldn't mind a bit".

The saying goes, so I am told,
That clothes don't make a man.
They cannot change the man beneath,
Yet some folks think they can.

I'm proud I wear the Army Brown,
Why should I be ashamed?
Because some fellows raised the deuce,
Why should we all be blamed?

Civilians go astray, you know,
But that is not the same
Because he's not in uniform
And no one knows his name.

We're human beings like the rest,
Not monsters of the land.
Because one soldier went astray
Why should we all be banned?

Mother says that folks will talk,
If Dorothy is seen with you.
But do these mothers all forget
That we have mothers too?

If comes the day when he is killed,
How do the people stand?
"How brave and fine a lad was he!
A credit to his land".

(Cheer up, Ron, we know just what you mean, but it'll all come right in the end—on your next posting!—Eds.)

How Big is Your Machine Shop?

MORE THAN MERE SIZE DETERMINES ITS CAPACITY

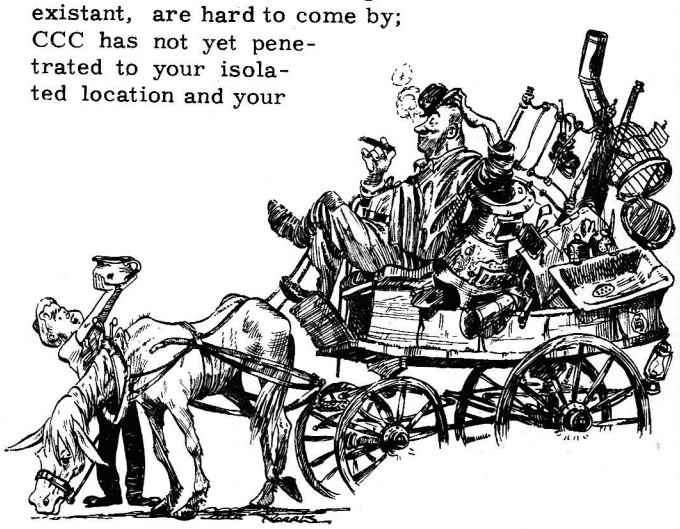
by CAPT I. C. SCARLETT, RCEME

No doubt your workshop has one, a machine shop that is, neatly chained in its allotted corner resplendent in the green and ivory of a new color-dynamic paint job. Likewise, within range of a well primed oil can, you will have all the elements of a blacksmith and welding shop and, if you are lucky, perhaps even a woodworking and sheet metal shop. But how often have you given a thought to how big this corner really is?

There are of course a number of ways in which you may arrive at its size. First you might consider the floor space. Probably this will approach the 30' x 40' recommended and, comforted by the promise of future expansion or a new workshop, you will be content to dismiss this consideration. Second, you might attempt to arrive at size by a simple count of machines, whereby you come up with so many lathes, etc. This, however, would be merely an inventory and as such should be filed in the second drawer from the top along with the corporal's spare shirt. Next, you might look to production, weighing work output against backlog and available man-hours. This, of course, gets much closer to the answer but manipulation of the figures can produce only a dimensionless quantity which, expressed as percentage, shows you your efficiency or lack of it as the case may be.

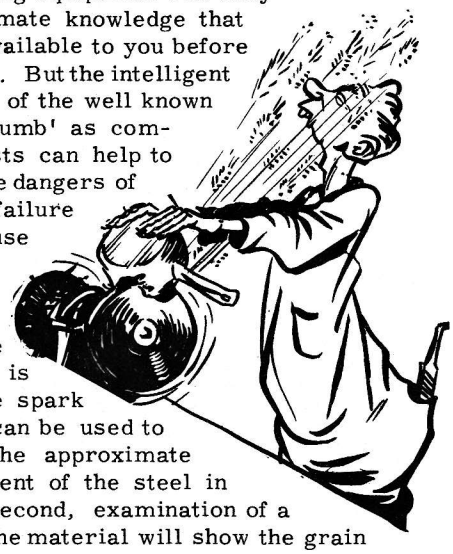
Having exhausted most of the possibilities, there are few channels left to investigate and it becomes apparent that the true measure of 'bigness' lies in what this section of your workshop can do to help you over the rough spots that arise from time to time. Thus the quantity becomes less tangible and must be looked for in the integration of the knowledge, skill and ingenuity of the workshop officer and his crew of tradesmen. This thought will undoubtedly bring to mind a number of occasions wherein the application of these factors has provided the answer to a distressing problem. Consider, for instance, the picture of the harassed sergeant major clutching a handful of badly mutilated gear parts explaining to the OC that the gear was part of a piece of equipment urgently required yesterday and that a rapid check has revealed that such gears are not available anywhere in the world. Such a problem can be a pushover if the shop is big enough to meet it. The scraps of evidence contained in the shattered gear parts provide the clues necessary for the reconstruction of the tooth form and the redesign of the gears. Armed with the necessary information, the skilled machinist can soon produce the needed part and the job will be well on its way to becoming another statistic to be juggled into the month-end return, rather than an unsightly stumbling block in the 'Waiting Parts' line.

While considering the potentialities of your workshop from this point of view it would, however, be wise to consider it in a much broader aspect. In its peacetime role, the average workshop machine shop enjoys a number of advantages that would not be as apparent under less favorable conditions. Let us for the moment remove the machines from their neat, colorful surroundings and visualize them set up in lorries, scattered about the fringes of a muddy field. Spare parts, although not entirely nonexistant, are hard to come by; CCC has not yet penetrated to your isolated location and your only dealings with the local merchants are limited to highly unsatisfactory bartering. To further complicate matters, the only material available is in a rusted scrap heap by the side of the road. Now, as the work rolls in, full opportunity is afforded for each member of the team to display his skill and ingenuity in turning up bits and pieces with the limited facilities available.



One of the first jobs to appear might necessitate the manufacture of a replacement of a short

drive-shaft. Being an astute character, you will immediately appreciate that the member will undoubtedly be subjected to high torsional stresses and that great care will have to be taken with the selection of the material and manufacture of the replacement part. Systematic examination of the damaged piece can, however, provide much of the information necessary for the selection of the material. Granted, the lack of proper testing equipment will deny you the intimate knowledge that should be available to you before you proceed. But the intelligent use of a few of the well known 'rules of thumb' as comparatibe tests can help to minimize the dangers of subsequent failure due to the use of inferior material. The best known of the above rules is probably the spark test which can be used to determine the approximate carbon content of the steel in question. Second, examination of a fracture of the material will show the grain structure and provide a clue to probable heat treatment. Finally, testing with a file will give an indication as to the hardness of the piece in question.



Armed with these few simple facts, a handbook on steel, a pair of hip boots and a defaulter to help with the heavy lifting, you are now ready to search your 'Stock' pile for a suitable piece of material. This, no doubt, will be the most difficult of the entire series of production problems. Assuming that the original piece was manufactured from a medium carbon machinery steel, you will set your sights for an old crankshaft, truck axle or some similar piece calculated to fall within the 0.4 carbon range. This will probably lead to a lengthy and exhausting search which will eventually reveal 'the piece', lodged firmly in a nest of old bed springs and truck frames. After you have extricated your prize and dragged it wearily back to the workshop lorry, you can run through the comparative tests to confirm that the piece is in fact suitable for the job at hand.

Having satisfied yourself on this point you will now be confronted by the problems of heat treatment. Before taking any positive steps in this direction, however, you had better try machining the stock in the 'as is' condition. In all likelihood you will find the machining properties of the metal such that there is no need for normalizing or annealing. If, however, you find that the piece chosen is too hard to respond favorably to a high speed steel tool bit, you have two courses open to you. First, you can attempt to induce softness by heat treating, or second, you can pull on your hip boots, collect your helper and start all over again. Of the two, the second is probably more advisable, since the attempted heat treatment of a steel of uncertain composition in a crude furnace or forge, completely devoid of temperature controls, is to be avoided if at all possible.

Assuming that you have been fortunate in locating a piece of stock of suitable proportions and properties, you are now prepared to proceed with the manufacture of the required component. Once again the machinist can demonstrate his ability and, in due course, when all production problems have been circumvented and the mistakes covered up, this worthy will appear on your threshold with the finished product in his hand. Immediately the question of heat treating will pop up for a second reviewing and as in the first instance, should be given careful consideration before a definite plan is established.

The arguments for and against heat treatment at this stage are many and varied. Foremost among those in favor of such action is the relief of stresses incurred during the various forming operations. This in itself is a powerful argument and in cases where there are abrupt changes in section, stresses are apt to become critical and may well mean the difference between the success or failure of the part. Ranged against this argument, however, are all the complex considerations of metallurgy as applied to the hardening and tempering of steel. As indicated previously, the equipment available will satisfy only the minimum requirements. Further, you have only a very sketchy knowledge of the composition of the steel with which you are about to work—information which is essential to proper heat treatment, since the entire technique must be governed by carbon content and the possible oxidation, scaling, decarburizing, cracking and warping prevail throughout the operation and these factors, difficult to control even under the best of conditions, may lead to trouble more quickly than the use of the metal in its original condition. Remember that if you are careful to select a piece of stock that has been previously heat treated to perform under conditions similar to these that will be present in the new employment, then the majority of properties present in the original piece will remain following subsequent machining operations, thus precluding the need for further heat treatment.

Having given full consideration to the various arguments, you will probably decide to put the piece into service without further ado. If,

(Continued on Page 45)

By CAPT K. F. COLLINS, RCEME

The methods of waging flame warfare dealt with in the preceding 'Flame History' section are a general background to flame warfare, and deal primarily with the first and more primitive ways of using flame as a weapon. Only in two instances (in naval warfare) is flame mentioned as actually being 'thrown'. This section will deal with the development of the technique of 'throwing' flame, and the trend towards greater mobility of the flame equipment.

The 'fire arrow' can be considered the first means of throwing a projectile contaminated with an incendiary substance. In classical warfare it is first recorded at the Persian capture of Athens in 480 BC. In addition to being fired from a bow, the flame arrow has been projected by various methods including the use of blowpipes by the Maoris. Arrows were also employed by the Chinese against the French, and were a favourite weapon among the native peoples of North and South America.

In search for more efficient methods of projecting the destructive force of fire it was natural that the catapult, which became highly developed as a siege engine, should be adapted for this purpose. De Joinville describes how he saw 'Green Fire', or some similar mixture thrown in this manner in 1248.

"The Saracens brought an engine called a petrary and put Greek Fire into the sling of the engine. The fashion of the Greek Fire was such that it came frontwise as a large barrel of verjuice, and the tail of fire that issued from it was as large as a lance. The noise it made in coming was like Heaven's thunder. It has the seeming of a dragon flying through the air. It gave so great a light, because of the great foison of fire making the light, that one saw as clearly throughout the camp as if it had been day."

These devices were based on the principle of throwing a projectile containing or dipped in an incendiary substance.

The first recorded instrument designed to project an incendiary liquid free from any form of container is described by Thucydides as being used by the Spartans against Dalium in 424 BC.

"They sawed in two and scooped out a great beam from end to end and fitting it nicely together again like a pipe, hung by chains at one end a cauldron. Now the beam was plated with iron and an iron tube joined it to the cauldron. This they brought up from a distance upon carts to the part of the wall principally composed of vines and timber and when it was near, inserted huge bellows into their end of the beam and blew with them. The blast, passing closely confined into the cauldron, which was filled with lighted coals, sulphur and pitch, made a great blaze, and set fire to the wall. The defenders could not hold it and left it and

fled. In this way the fort was taken."

Later, a similar contrivance was used by the Romans against the Dalciens in AD 107, but in this case the contents of the cauldron consisted of powdered charcoal, which was said to prove effective even against stone walls.

Centuries later, in 1702, the Prussian Army made trials of a 'serpent-fire-spray (Schlangen-Brand-Spritze)' supposed to project a mass of fire twelve feet wide and forty paces long. Its inventor, P. Lange, claimed that "two sprays are capable of defending a breech." The device was dropped in 1704, presumably because it did not fulfill the claims of its inventor.

During the siege of Paris in 1871, Bartelot proposed to repel the enemy by means of pumps projecting jets of blazing petrol. He adds bitterly; "But this agent, of questionable value against long range weapons, was not really put to the test except by the Commune, to burn our palaces."

The first use of the flame thrower in warfare was made in the 20th century by the Germans, against the French lines at Melancourt on 26 February 1915.

Times History of the War (1914-18)

Hausenstein attributes the immediate origin of the 'true' flame thrower to the work of a Berlin engineer, Leidler, the 'rediscoverer of Greek Fire'. He gives a typically lurid account of its first dramatic effects when used against the French at Melancourt.

"House-high over the burning ground rose an uncanny reeking and bubbling smoke pillar, which enveloped everything. Panic, terror and horror were spread by these jets of flame, inexplicable to the enemy. There was no more hope of rescue for the unfortunate who did not contrive at the last moment to reach the parados of the trench with a redoubled spring and run headlong across country towards the rear, still pursued by the greedy hell-breath of the flames and heedless of the random shooting of his own machine guns in the second trench, with frenzied shrieks: "L'enfer! L'enfer! Sauvez-vous! Sauvez-vous!"

The first employment of German flame throwers against the British was in July 1915, at the outmost point of the Ypres salient near the ruins of the little village of Hooge. The attack is thus described in the official History of the Great War.

"The 8th Rifle Brigade held the front of the Hooge crater, with the 7/KRRC on its right. The crater itself was untenable, owing to constant trench mortaring and strafing and the trenches, dry but dilapidated beyond measure, ran up to the lip on either side, with no definite connection around the crater. The sector had an evil reputation for being subject to incessant sniping and bombing, besides trench-mortar and shell-fire; but on the night of the 29/30th when the two battalions took over from the very tired and worn 7/Rifle Brigade and 8/KRRC there was an ominous silence. No notice was taken by the enemy of the noise inseparable from a relief and even a few bombs thrown by the newcomers into the German trenches, in places only fifteen feet away, provoked no reply.

Half an hour before the dawn the trench garrison stood to arms and there was still complete quiet. Then at 0315, with dramatic suddenness came the carefully planned German stroke. The site of the stables of the chateau was blown up, whilst a sudden hissing sound was heard by the two companies of the 8th Rifle Brigade on either side of the crater, and a bright crimson glare over the crater turned the whole scene red. Jets of flame as if from a line of powerful fire hoses, spraying fire instead of water, shot across the front trenches of the Rifle Brigade and a thick black cloud formed. It was the first attack on the British with liquid fire. At the same time fire of every other kind was opened; trench mortar bombs and hand grenades deluged the front trenches, machine gun and shrapnel bullets swept the two communication trenches and the three hundred yards of open ground between the front and support lines in Sanctuary and Zouave Woods. High explosive shells rained on these woods, whilst the ramparts of Ypres and all exits from the town were bombarded anew.

The surprise was complete and would have led to an entry even at the strongest point of the line. Most of the 8th Rifle Brigade in the front trenches were overwhelmed, the rest fell back gradually over the fire swept open ground to the support line.

In a counter attack some ten days later, the whole of the line concerned was won back, but at considerable cost. Two of the German flame throwers were captured by the 14th Division in this counter attack.

These were found to consist of a cylindrical steel vessel, about two feet in height, and fifteen inches in diameter, fitted with straps for carrying, and divided internally into a compression chamber and oil reservoir. The propellant was nitrogen at 23 atmospheres contained in the upper chamber. A short length of flexible hose ended in a nozzle in which was fitted the ignition device. As the oil emerged under pressure, it forced up the plunger of a friction lighter and ignited a core of fuse mixture surrounding the nozzle which remained alight long enough to enable a number of shots to be fired."

In this dramatic manner was the first of a long line of modern flame throwers launched into 20th century warfare.

The British were not slow in retaliating. In June 1916, before the Battle of the Somme, a portion of 'Z' Company of the Special Brigade arrived in France with four large and sixteen small portable machines. The large machines had been designed by Mr. Livens in collaboration with his father, Mr. F.H. Livens, and a ton of oil was required for each shot. The machines could be dismantled into a larger number of parts, each of which could be carried by two men.

Several attempts were made to set up three of the large machines in front of the 18th Division, branches from the existing underground mine galleries being used for the purpose. The galleries were repeatedly blown in by heavy shells but by June 30th, two of the projectors were ready to fire. The flame throwers were so designed that the nozzles could be driven through the last remaining crust of earth by the pressure gas used for propelling the oil, so that their position would remain undisclosed until the last possible moment.

At zero hour on July 1st two jets appeared out of the ground to a height of two or three feet above the surface; the ignition functioned perfectly and the two streams of oil were projected into the enemy trench, being traversed slowly from side to side. The flames were accompanied by dense clouds of black smoke, heavy machine gun fire was opened, and the British infantry occupied the trench without opposition. The ranges obtained by the projectors, as measured along the burnt ground, were 94 and 87 yards. The small portable machines intended for this operation, were not used as no opportunity presented itself.

The large machines were fired on one or two occasions within the next few weeks but it had become evident that their local effect did not justify the great labour and difficulty of bringing them within range of their objectives.

Only on one future occasion at Dixmude on October 27, 1917, was one of the large machines fired and then only as a supplement to every other form of weapon. Indeed it was learned subsequently from prisoners that the flame thrower had caused no casualties, the garrison of the 'Minotorie' against which it had been directed, having already fled in terror.

The Germans and French made use of the small portable flame throwers frequently until the end of the war, but no large scale operation is recorded.

The conditions of those times gave the flame thrower little chance to prove its worth. What happened with the tank and what occurred so often with the employment of novelties, they were tried in small numbers, with the result that the full value of the element of surprise was not properly exploited.

Flame throwers were intended to play a part in the attack of Zeebrugge on St. George's Day, April 23 1918. HMS Vindictive was fitted with two large machines built into special towers on the port side of the ship. It was planned that these should be used as she lay alongside the Mole, but unfortunately both were shot away in the final dash from the shelter of the smoke screens and played no part in the assault.

The end of the First Great War in 1918 stopped most experimental work on flame throwers and little development work was done until after 1930.

RCEME SCHOOL GATE COMPETITION

All entries are now in the hands of the judges appointed by the Prize Committee of the RCEME Corps Association.

Unfortunately the results are not available for this issue as promised. We are quite sure however that the winning design will be published in the April Quarterly.

Janitor (coming upon couple in corridor): "Are you going to kiss that girl?"
Student: "No."
Janitor: "Well, then, hold my broom."

BOLTS an' ASSORTED CLIPS by ar-vek-tel

BLAZERS AND CRESTS

We are indebted to Major P. Andrews REME, interchange officer at the RCEME School, for passing on the following interesting information on REME Corps blazers and crests in reply to an enquiry of ours. His authority is DME Co-ord, The War Office and, according to the major, "you can therefore rest assured that the information is correct". (We certainly agree with him!)

"The (REME) Corps blazer is a plain single breasted garment adorned only with flat engraved regimental buttons of a special type.

"The Corps badge is, however, worn on the breast pocket by those members of the Corps who, by reason of their prowess in the field of sport, are awarded Corps 'colours' and receive notification of this fact in writing from the chairman of the REME Sports Committee."

In our Corps, all members of it are entitled to wear the badge on their blazer, as laid down in the old DME Departmental Instruction No. 383 (shortly to be republished as a Corps Instruction). No 'colours' for any sport have yet been awarded in RCEME. Probably if they were, such a distinction would be made by providing a scroll naming the sport under the Corps badge itself.

Why is a Lieutenant-General senior to a Major-General?

In the early part of the 17th century there were generals of Horse and generals of Foot and overall was the captain-general whose deputy or lieutenant was the lieutenant-general. The chief staff officer of the captain-general was the sergeant-major-general; sergeant was dropped in the latter part of the century to give the present major-general. (A general in the field would normally command an army, a lieutenant-general a corps and a major-general a division.)

Some motorists have had their cars for years and never had a wreck. There are others, however, who have had their wrecks for years and never had a car.

PERSPECTIVE

SIR ANTHONY BOWLEY, head of the British delegation to the international conference on standardizing bolt and nut sizes, talked recently of incidents that illustrate problems in developing international standards.

Here's an example: British engineers felt it was quite illogical for us to have nuts that in smaller sizes were larger than bolt heads, but were smaller than bolt heads in larger sizes. Turns out that our standard is not an engineering, but a practical one, based on the fact that smaller bolts are customarily highly stressed (in automotive and aircraft work, for example), large ones are not. Thus, smaller nuts on larger bolts save metal, but make an "irregular" standard. The British conceded, after this explanation.

Incidentally, the British made the great concession of accepting the American standards as a working basis, thus creating an inventory problem for themselves for the next 50 years, but smoothing the path of the conference. They realize that, in international agreements, there are three alternatives: accept the idea of one country or the other, or compromise. But a compromise is usually ignored by both parties.

—American Machinist.

DON'T HOARD

YOUR QUARTERLY!

Pass it to your men to read! It doesn't do any good looking nice and clean and unread in your desk drawer.

NO CHOICE

Much against his will, the young suitor had been persuaded to go through the formality of stating his intentions to his prospective father-in-law.

"So you want to become my son-in-law, do you?" the old man remarked grumpily.

"Frankly, no," returned the suitor, "but I see no way out of it if I want to marry your daughter."

What do you know?

Here instrument mechs and artificers are 20 questions, some of which you may be required to answer at any time. (Answers on Page 47)

1. What cutting fluid is used when milling cast iron?
   (a) Lard oil.
   (b) None.
   (c) Soluble oil.
2. A pump sends 5000 gallons of water to a height of 150 feet every 5 minutes. Efficiency of the pump is 75%. What HP is required to drive it?
   (a) 110 HP.
   (b) 48 HP.
   (c) 60.6 HP.
3. What type of pivot has the Theodolite, Optical Scale, 3 1/2-in No. 5?
   (a) Steel, parallel, independent.
   (b) Adjacent, tapered, brass.
   (c) Adjacent, tapered, steel.
4. What is absolute zero?
   (a) Zero degrees F.
   (b) -460° F.
   (c) The temperature at which alcohol freezes.
5. What determines whether the value of an epicyclic gear train is positive or negative?
   (a) The number of gears in the train.
   (b) The speed of the driving gear in relation to the speed of the output.
   (c) Depends on whether the first and last gears rotate in the same direction or opposite directions.
6. What is a planimeter?
   (a) An instrument for determining the flatness of plane surfaces.
   (b) An instrument for estimating the areas of irregular figures.
   (c) An instrument for determining the centre of gravity of an irregular shaped piece of material.
7. What is the trapezoidal rule?
   (a) A method of obtaining the mean ordinate of an irregular figure for the purpose of determining the area of the figure.
   (b) An instrument for measuring the area of a trapezium.
   (c) A special steel rule.
8. The volume of a sphere is
   (a) $\frac{4}{3} \pi r^3$.
   (b) $\frac{\pi}{6} d^3$.
   (c) $4 \pi r^2$.
9. One of the graphs of a rectangular hyperbola is?
   (a) $xy = 8$.
   (b) $4y = x^2$.
   (c) $y = ax^2$.
10. What is a prismoid?
    (a) An irregular-shaped solid having 5 or more flat or plane faces, 2 of which are parallel.
    (b) A solid contained by 5 plane faces with the base a rectangle, the 2 ends triangles, and the 2 remaining faces trapeziums.
    (c) A sector and a cone whose bases are coincident.
11. The critical angle for crown glass is approximately?
    (a) 30°.
    (b) 42°.
    (c) 48 1/2°.
12. Why are surveyor's transits constructed so that the image of an object seen through the transit is upside down?
    (a) To save the cost of an erecting cell.
    (b) To provide greater accuracy by eliminating the extra air-to-glass surfaces an erecting cell would entail.
    (c) To decrease the weight of the instrument.
13. What is the difference between a convexo concave and concave meniscus lens?
    (a) No difference.
    (b) One is positive and one negative.
    (c) The focal lengths differ.
14. In optical instruments, what is meant by dioptres?
    (a) Measure of lens diameter in mm.
    (b) The focal length of a lens.
    (c) The reciprocal of the focal length of a lens.
15. What is the difference in degrees, minutes and seconds between 10 mils and 10 degrees.
    (a) 4° 26' 55 1/2".
    (b) 9° 26' 15".
    (c) 16' 48".
16. What is hysteresis?
    (a) An emotional disorder.
    (b) A loss of electrical energy due to rapid reversals of magnetic polarity, wherein magnetism lags behind the force.

(c) A small amount of magnetism permanently retained by a mass of iron.

17. Who defined this law "The algebraic sum of the currents which meet at any point is zero"?
    (a) Ohm
    (b) Boyle
    (c) Kirchhoff
18. What is specific gravity?
    (a) A number indicating how many times a certain volume of a material is heavier than an equal volume of water.
    (b) A number indicating how many times a certain volume of water is heavier than an equal volume of a material.
    (c) A number indicating the difference in volume of a material and the volume of an equal weight of water.
19. What are machinist's buttons?
    (a) A button denoting union membership.
    (b) Round metal discs used by machinists for accurate measurement for the precision drilling of holes.
    (c) Metal discs used in conjunction with a Sine bar for measurement of angles.
20. What is a molecule?
    (a) A quantity of matter made up of protons, neutrons and morons.
    (b) Smallest unit quantity of matter which can exist by itself and retain all the properties of the original substance.
    (c) A minute particle with a positive electrical charge and mass similar to that of an electron.

— WOII W. A. Wright RCEME

DME SPEAKS TO ASME IN TORONTO

The DME, Colonel C.R. Boehm, was honoured by an invitation to speak to members of the Ontario Section of the American Society of Mechanical Engineers in order to further the interest of this group in Army engineering problems.

Under the able chairmanship of a former DME, Colonel H.G. (Spike) Thompson, a dinner and business meeting was held in the graduates' dining room at Hart House, University of Toronto on 14 December. Later the members assembled in the music room to hear a paper presented by Colonel Boehm on his favourite subject 'Electrical and Mechanical Engineering in the Canadian Army'.

The engineering audience, which contained a large percentage of veteran officers, asked many questions indicating their interest and appreciation of the problems related to the maintenance of army equipment. Old times were recalled when a former CREME criticized the layout of a modern RCEME workshop because of the omission of workshop space earmarked for his specialty—manufacture of caravans.

Some highlights of the DME's paper will be presented in the April Quarterly—Eds.

(Continued from Page 39)

however, stress relieving appears essential, it would be advisable to use a rough sample of the material to test your plan before exposing your finished specimen to the rigors of heat treatment. Use a gas-air mixture as your source of heat if at all possible and employ oxy-acetylene only as a last resort. Propane or natural gas, properly mixed, will give fast, clean, uniform heat with the desired reducing atmosphere whereas oxy-acetylene is too hot for successful heating and tends toward overheating and local melting. As a guide for temperature you can use the color-temperature charts for heating and tempering and as a quenching medium you may use either oil or water. Do not use water until you have satisfied yourself that you can not obtain the desired hardness by quenching in oil.

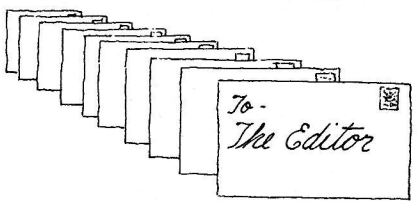
Your successful solution to problems of this type will measure the true 'bigness' of the metal working section of your workshop. A moment's reflection at this point makes it apparent that the factors most necessary lie not in the equipment available but rather in the individual. Each decision must be tempered with good judgement and a regard for sound design and economy of time and effort, but when the chips are down you must be prepared with the 'know how' necessary for the design and fabrication of needed parts. The lack of a horseshoe nail once lost a war; it may be your privilege to construct the counterpart that will help to win one.

ARE YOU A WORKSHOP COMMANDER?

It is YOUR DUTY to see that all ranks have an opportunity to read this issue of the Quarterly!

Basis of distribution is one copy per officer on establishment and at least three additional copies for circulation to other ranks.

Letters



Sergeants' Mess,
RCEME School, (Staff)
Kingston, Ont.

Dec 15, 1950.

The Editor,
The RCEME Quarterly,
Directorate of Mechanical Engineering,
Army Headquarters, Ottawa.

Dear Sir:

May I obtain a copy of the RCEME Quarterly with the new RCEME crest on the cover and the explanation of the symbols inside. Or a copy of tne cover and an explanation of the meaning of the symbols.

May I be a regular subscriber and get a copy of the Quarterly regularly.

I see in July (1949) you asked for letters, even beefs. Mine is that I can never get my hands on a copy of the Quarterly. I certainly think you have a swell little publication and hope I may subscribe.

Sincerely,
F. Davis, S/Sgt.

[We have forwarded the copy requested by S/Sgt F. Davis. We regret that lack of funds restricts the circulation but we have made it plain over and over again that the Quarterly should be made available for reading by all men interested. We are continually examining our distribution list towards this end. —Editors.]

HQ RCEME Quebec Command
3530 Atwater Avenue
MONTREAL, Que
3 Jan 51

The Editor,
RCEME Quarterly.

The article entitled 'The RCEME Workshop' which appeared in the July and October issues of the Quarterly has proved to be of great assistance. We are now in the process of planning a 100 man workshop and the well-presented material in the articles has saved us a great deal of preliminary work.

I would like to express my thanks to the Quarterly for a real service rendered. The more articles of this nature that the magazine can publish the greater will be its value to the Corps.

A. Miller Lt-Col,
Commander and CEME,
HQ RCEME Que Comd.

(Continued from Page 37)

chain letter idea was used to get as many names of RCEME veterans as possible and the result was 'a definite success'. A repeat performance is in prospect for 15 May this year.

The Winnipeg Group reported regular work disrupted because of the Red River floods (see Operation Redramp, July Quarterly) but organized visits to industrial and engineering projects were carried out 'with signal success'.

The Vancouver Group held a dinner meeting in honor of Brig Grant's visit (see also July Quarterly) when thirty guests representing a cross section of local industry useful to Reserve Force RCEME were present. This Group also held an all-ranks' reunion with an attendance of 120.

Lt Col C. W. Jones, acting DME in the absence of Col Boehm at Fort Lewis, Wash, reviewed the activities of RCEME Corps.

Lt Col F. W. Cranston, Chairman of the Nominating Committee reported that Brig Grant and Lt Col LeS Brodie had been nominated for president and secretary-treasurer respectively. By a show of hands they were enthusiastically and unanimously elected to carry on for another year.

* * * * *

At an executive meeting following the general meeting, Capt L. R. (Scotty) Aikin, 4th Tech Rgt RCEME Toronto, was appointed chairman of the Publicity Committee. He will be responsible for gathering Association news and forwarding it to the Editor of the RCEME Quarterly.

The executive committee recommended that each Chapter and Group appoint an Association publicity representative to work with Capt Aiken. His address is 4th Tech Rgt, 132 St. Patrick St, Toronto.

The second meeting of the Ottawa Group was held on 12 Dec in the 26th Tech Sqn RCEME Mess. Col E. C. Mayhew RCEME gave a very interesting talk on Canadian Arsenals Ltd.

It was decided that a regular meeting would be held on the last Tuesday of every month in the same mess commencing 30 Jan 1951.

PERSONALITIES

PROMOTIONS

To be Captains:

E. A. Barnes, 5 Company
B. A. Beneteau, 25 Support Workshop
J. C. Boughton, OC 170 LAD
L. F. Holland, Tels Section, DME
H. F. Protheroe, Wksp Section, DME
A. L. D. MacDonnell, OC 159 LAD
P. A. Tuck, RCEME School Staff

To be Lieutenants:

F. R. Carruthers, 3 Company
H. W. Chapman, 17 Company
G. F. H. Chess, 10 Company
G. D. Clark, 202 Base Workshop
J. S. Crowson, 3 Company
L. A. Daviss, 12 Company
J. D. Delaney, 6 Company
R. J. Evans, 17 Company
S. A. Fougere, 6 Company
D. V. Geary, 1 Company
W. J. N. Haggins, 2 Company
J. W. Lelacheur, RCEME School (WE)
H. E. MacFarland, RCEME School (WE)
R. K. Martin, 202 Base Workshop
D. R. Mowbray, 12 Company
L. A. Sainsbury, 10 Company
G. D. Savage, 3 Company
W. G. Svab, 4 Company
G. A. Wright, RCEME School (WE)

* * * * *

Lt Col S. Stucken seconded to Cdn Arsenals Ltd Ottawa

* * * * *

POSTINGS

LT COLS

R. A. Campbell—DSD, AHQ
R. H. Ramsay—Cdn Army Staff College Kingston

MAJORS

V. W. Bethel—A/ADME Tels Section DME
H. Brown—P&T Section DME
D. D. Campbell—Scaling Section DME
J. N. Cram—DAAG, HQ Eastern Command
W. A. Down—OC 25 Support Workshop
D. T. Kennedy—UK as exchange officer
G. T. Kirk—RSO at NS Tech, Halifax
R. C. Lane—OC 3 Coy, Kingston
I. M. McLaughlin—A/ADME Armt Section DME
K. L. Murray—IQS, AHQ
J. P. Sherren—HQ Prairie Command

CAPTAINS

R. A. Auckland—25 Support Workshop
W. Beddard—10 Coy
J. N. R. Campbell—5 Sec A&T Staff
D. G. Carlyle—RCEME School
K. F. Collins—DME
J. E. Cuzner—RCEME School
F. L. Demone—2 Coy
J. B. Dewhurst—25 Support Workshop
W. H. Hawkins—7 Coy
T. R. Heal—MC of S, UK
V. D. Kenyon—MC of S, UK
W. H. Lane—Cdn Army Staff College
E. W. Laver—GIII Cdn Army Staff College
W. G. Warren—HQ RCEME Central Command

LIEUTENANTS

W. D. Alexander—2 Coy
R. K. Beach—5 Coy
G. R. Burton—13 Coy
J. L. Calvert—10 Coy
F. W. Chapman—10 Sec A&T Staff
J. F. Clarabut—205 Base Workshop
B. C. Clerke—11 Coy
B. Deibert—Att A Sqn 1/2 Armd Regt
B. H. Goodings—202 Base Workshop
D. A. Grant—11 Coy
R. A. Hill—25 Support Workshop
W. M. James—Reinf Group CASF
K. R. Joslin—205 Base Workshop
J. J. Kane—6 Coy
N. G. Lane—25 Support Workshop
A. C. Leonard—RCEME School
R. W. Libbey—7 Coy
J. A. MacDonald—11 Coy
R. A. McKay-Keenan—10 Coy
J. A. McKinnon—Reinf Group CASF
J. W. Moody—16 Coy
P. H. North—10 Coy
H. C. F. Pfeiffer—DME
P. Prediger—RCEME School
R. E. Rodgers—23 Comp Bde Gp Workshop
R. N. Shaw—11 Coy
W. R. Shaw—205 Base Workshop
P. G. Leger—202 Base Workshop
C. R. Morgan—RCEME School

2/LIEUTENANTS

B. E. Babcock—University of Alberta
H. R. Cavanagh—Queens University
R. D. L. Connell—University of Alberta
J. W. Courtney—Nova Scotia Tech
C. B. Creber—University of British Columbia
K. F. Duggan—Nova Scotia Tech
C. B. Hellyer—11 Company
J. C. Ormond—Nova Scotia Tech
R. Peters—University of Alberta
W. E. Royds—University of Toronto
J. O. Sheehan—202 Base Workshop
G. A. St. Onge—Nova Scotia Tech
J. A. Stott—University of British Columbia
W. R. Willing—University of Western Ontario

DIED

On Saturday evening 16 Dec 50 Major H. A. Rice following a heart attack at his home in Arnprior. At the time of his death he was in charge of Corps training at the School, where among other duties he passed along his wide experience in RCEME in teaching the intricacies of efficient workshop management.

'Harry' as he was known to most in the Corps was born at Carleton Place on the ninth of October 1905. He enlisted in No. 1 Bridging Coy RCASC on 3 Sep 39 proceeding overseas with 1st Div Petrol Coy RCASC three months later as a sergeant. He went to France with 4th Fd Ambulance RCAMC in June 40 as a CSM and remained with them until January 41 when he was posted to 1 Cdn Div Amn Coy and promoted to MSM (WOI).

In April of 42 he was sent to OCTU, and received his commission in RCASC in Jul 42. In Aug of that year he transferred to RCOC on posting to the Advance Component 1 Cdn Base Ord Wksp. He was made Capt in Apr 43 at the Base Wksp and completed the Mil College of Science EME/FAE course in Jan 44. On the formation of RCEME he was transferred from RCOC and was in France from Jul 44 with 1 Cdn Adv Base Wksp until his return to Canada on rotation leave in Apr 45. For his service in Europe, he was awarded a 'Mentioned in Despatches'.

In May 45 he was attached to 2 Coy RCEME Toronto until Nov 46 when he was posted to QMG Branch (DME) Ottawa. He was promoted to the rank of Major Apr 47 and was employed as DADME Wksps Gp until Sep 49 when he was posted to the IQS as DAQMG. He went to the RCEME School as Senior Instructor in Oct 50.

Major Rice resided in Arnprior with his family from the time of his posting to Ottawa where he took an active interest in all community activities. He was Scoutmaster of the Arnprior Scout Troop for some time, and a member of the Lions Club serving on many committees. He was an ardent boating and water skiing enthusiast, and was one of the organizers and a past Commodore of the Sandy Beach (Arnprior) Boat Club.

Major Rice was married in 1926 to the former Hazel Elizabeth McConeghy who survives him, along with two sons, William and Harry, his mother and a brother.

Major Rice was buried on 19 Dec with full military honours in the Arnprior Cemetery, mourned by men, women and children of all ages and from all walks of life. The twelve-man firing party were all RCEME recruits trained by him at the School. Pallbearers were RCEME Officers from the School and Army Headquarters.

In the death of Harry Rice, RCEME has lost one of its more experienced and most respected officers, one who will be very difficult to replace.

—Capt A. J. Jeffery, RCEME.

The Directorate of Mechanical Engineering was well represented in the Armistice Day parade in Ottawa, and our staff photo shows the four veterans who took part.

They are (l to r) Cpl N. C. Ruch; Sgt J. E. D. Lacelle; Cpl H. Regimbal and Cfn H. H. Kelly.

These young RCEME veterans are all entitled to wear the following medals: France and Germany Star; Italy Star (Ruch excepted); 1939-45 Star; Defence Medal; Cdn Vol Service Medal with clasp and Victory Medal. Cfn Kelly has also the Efficiency Medal with clasp for previous service in the NPAM.

ARE YOU A COLLECTOR?

If you are, concentrate on stamps, coins and butterflies but pass this Quarterly on to an interested other rank.

ANSWERS TO QUIZ ON PAGE 44

1(b); 2(c); 3(a); 4(b)(This is the temperature at which all molecular action ceases); 5(c); 6(b); 7(a); 8(a) or (b); 9(a); 10(a); 11(b); 12(b); 13(a); 14(c); 15(b); 16(b); 17(c); 18(a); 19(b); 20(b).